American Artisan

Founded 1880

The Warm Air Heating and Sheet Metal Journal

Vol. 95, No. 20 CHICAGO, MAY 19, 1928 $2.00 Per Year

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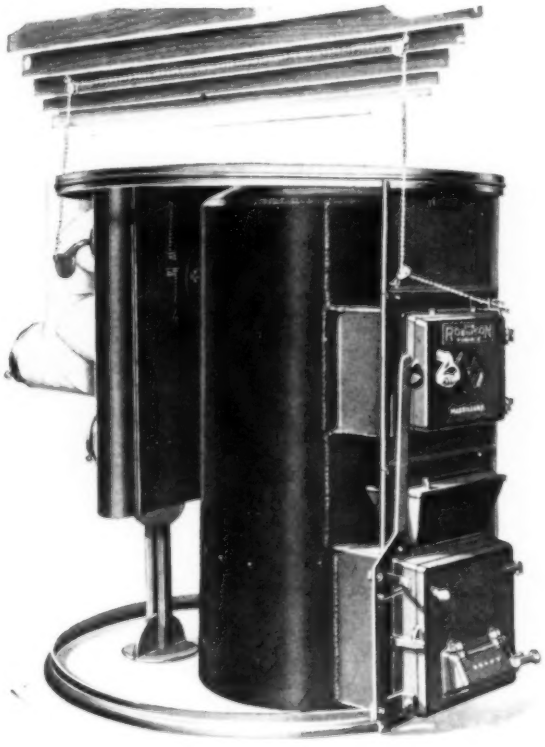

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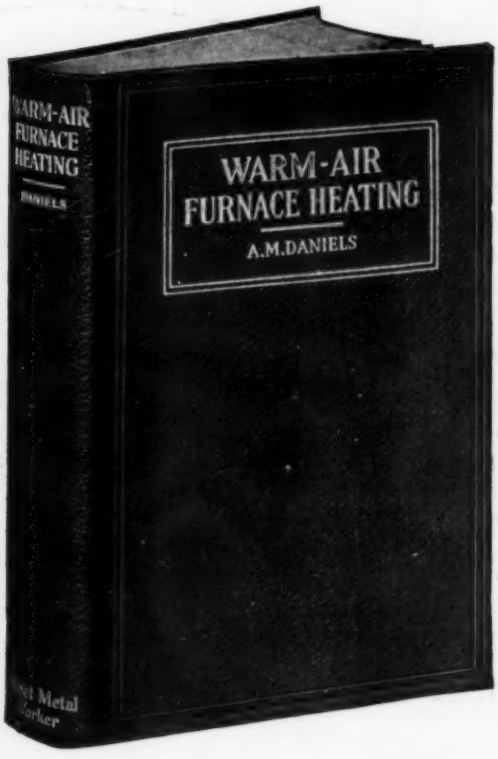

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1. Historical.
2. Typical Gravity Pipe Warm-Air Heating Systems.
3. Types of Warm-Air Furnaces.
4. Details of Furnace Construction.
5. Heat Losses.
6. Effect of Register-Air Temperature, Leader Area and Size of Wall Stack Upon Heating Effect Produced.
7. Insulating Coverings and Their Effect Upon Leader and Wall Stack Operation.
8. Casing Diameter vs. Furnace Capacity.
9. Air Supply to Furnace.
10. Furnace Capacity and Rating.
11. Register Grilles vs. Plant Capacity.
12. Chimneys and Flues.
13. Humidity.
14. Evaporating Pans.
15. Combination Heating Systems—Warm Air and Hot Water.
16. Gas Warm-Air Heating.
17. Oil-Burning Warm-Air Heating.
18. One-Pipe Furnace Heating Including Modifications.
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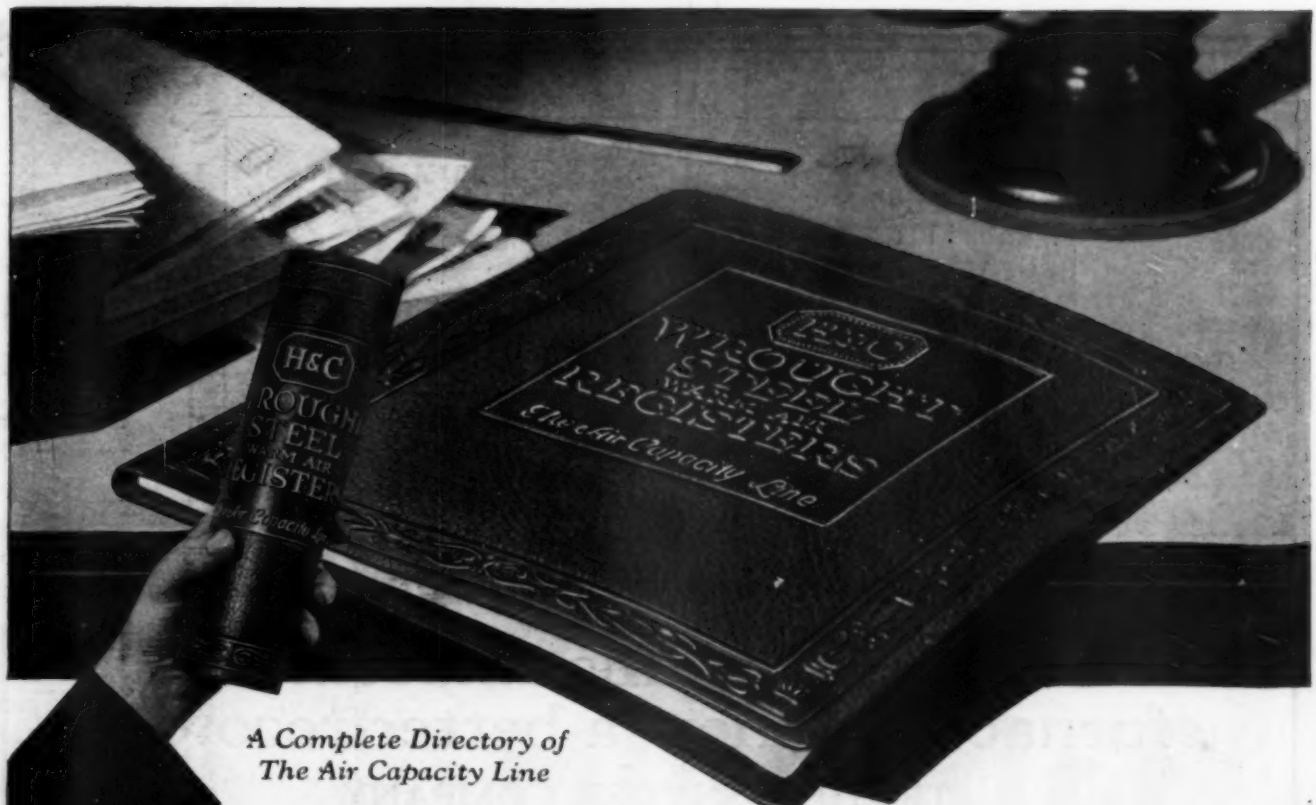

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"The Air Capacity Line"

Published Weekly by American Artisan and Hardware Record, Inc., 620 South Michigan Avenue, Chicago, Illinois. AMERICAN ARTISAN—the Warm Air Heating and Sheet Metal Journal—entered as second class matter, March 26, 1928, at the Post Office at Chicago, Illinois, under act of March 3, 1879. Formerly entered on June 25, 1887 as American Artisan and Hardware Record.

January 9, 1928

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Yours truly,
(Signed) Charles D. Eliot,
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We invite any manufacturer of furnaces to show a better record.

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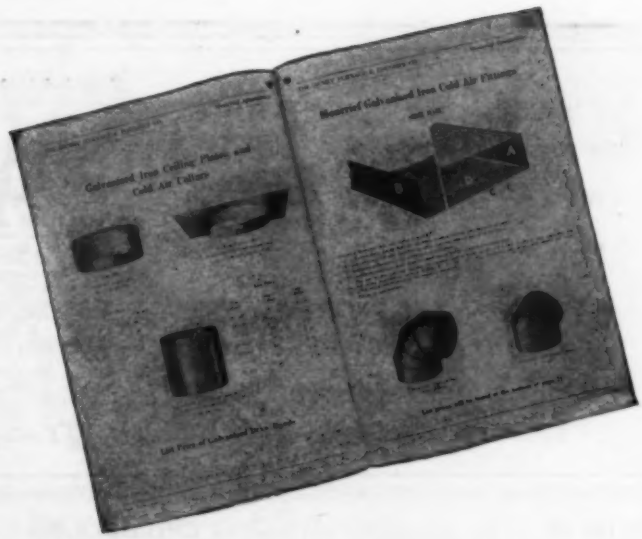

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American Artisan

The Warm Air Heating and Sheet Metal Journal

Yearly Subscription Price:
United States.....$2.00
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Published EVERY SATURDAY at 620 South Michigan Avenue, Chicago

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Etta Cohn — Franklin Butler — G. J. Duerr
J. F. Johnson — Chas. E. Kennedy — Frank McElwain

Eastern Representatives: M. M. Dwinell, J. S. Lovingham, 156 Fifth Avenue, New York City

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THE MOST VALUABLE THING IN THE WORLD

I am the most desirable thing in life. Without me no one can be healthy, happy or useful.

The hidden wealth and vast resources of this earth would have no value without me.

I am the great developer of man. No other agency has called forth so many of his hidden treasures, developed more power of mind and body than I have.

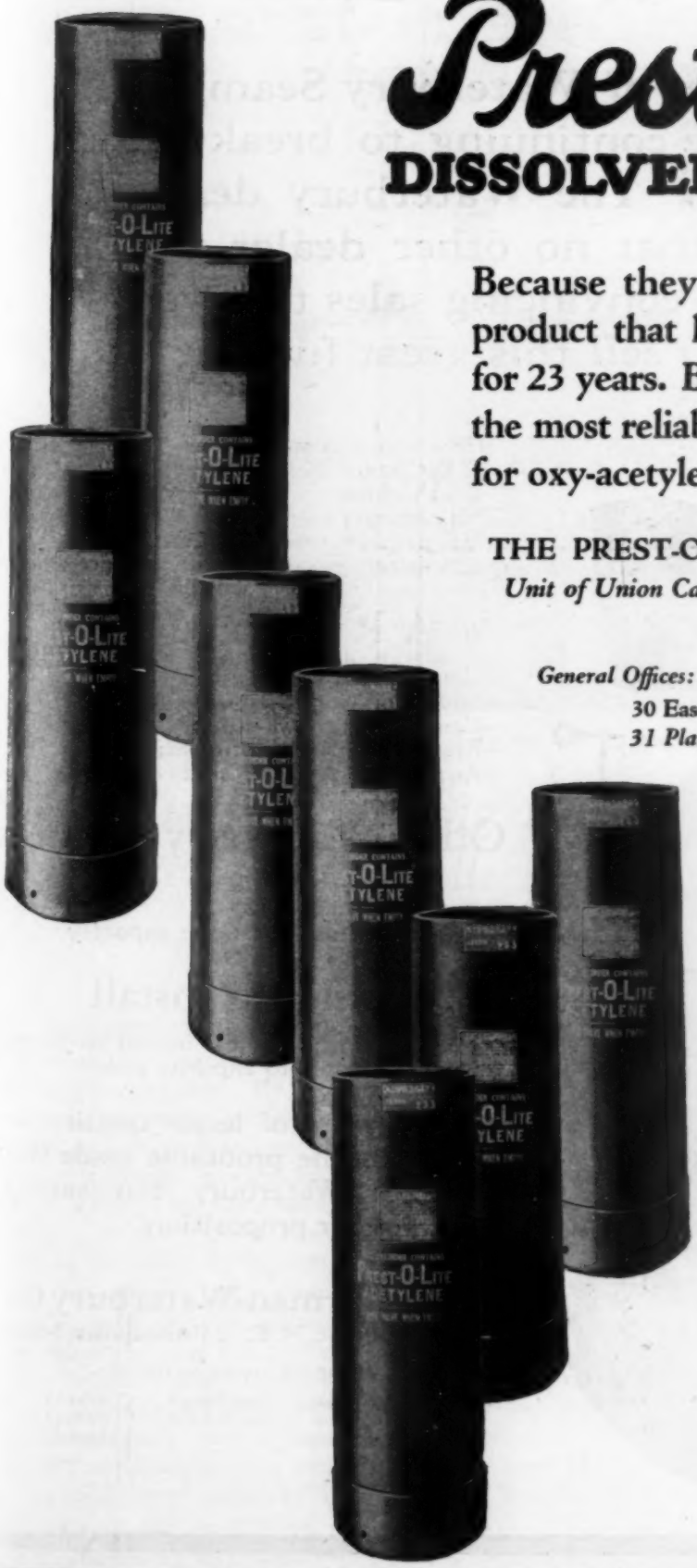
Men and women who try to get along without me are characterless, selfish, undeveloped, useless and unprofitable members of society. I am behind every fortune, every art and science, every achievement, every triumph of man.

Rich men and poor men alike often try to find substitutes for me, hoping thereby to secure a larger measure of happiness, peace, and satisfaction, but they are always bitterly disappointed. Instead of gain, every substitute for me brings them infinite loss.

As the creator is greater than the creature, so I am greater than wealth, power, fame, learning, or any other acquired possession or quality of man, because I am the source through which he acquired them.

I am—Work.

People keep right on buying



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Because they have confidence in a product that has been manufactured for 23 years. But mainly because it is the most reliable and economical fuel for oxy-acetylene welding and cutting.

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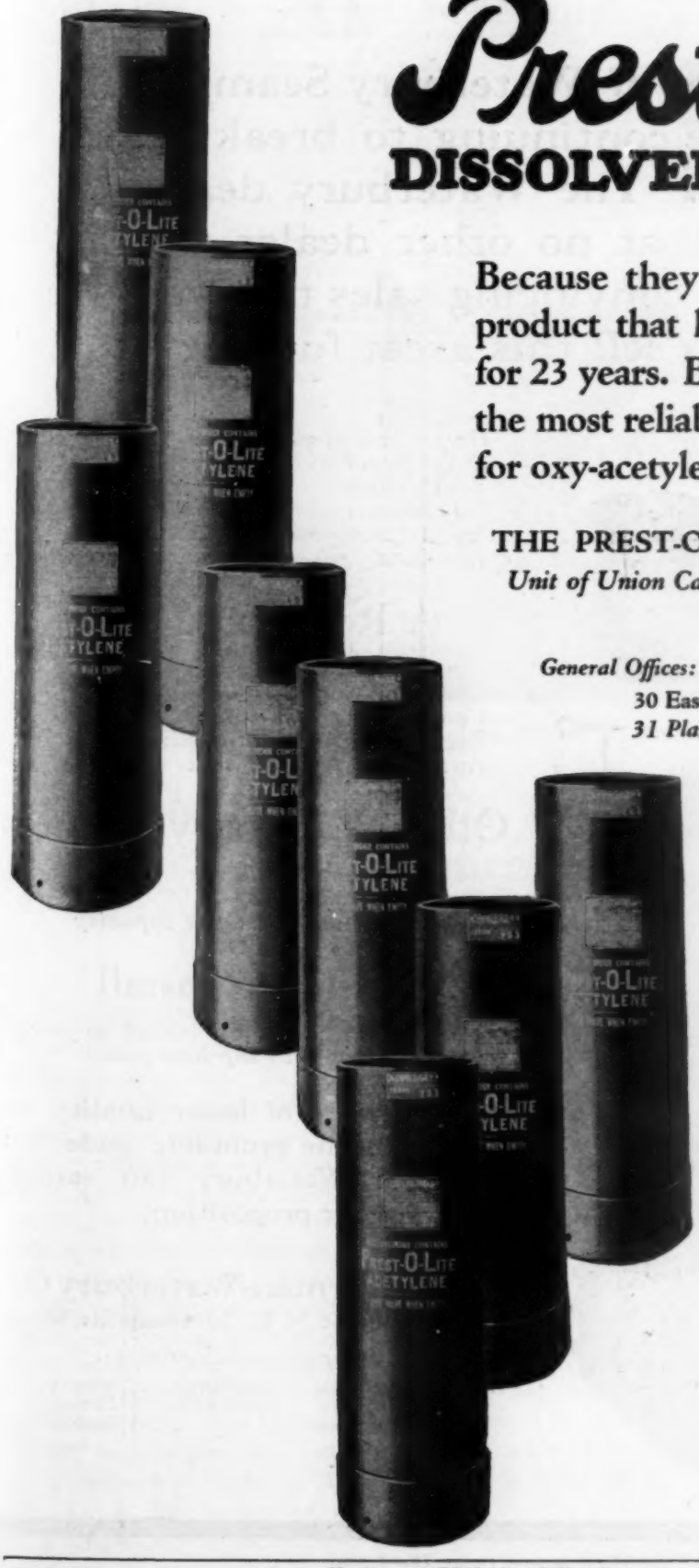

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Here's Your Sales Talk!

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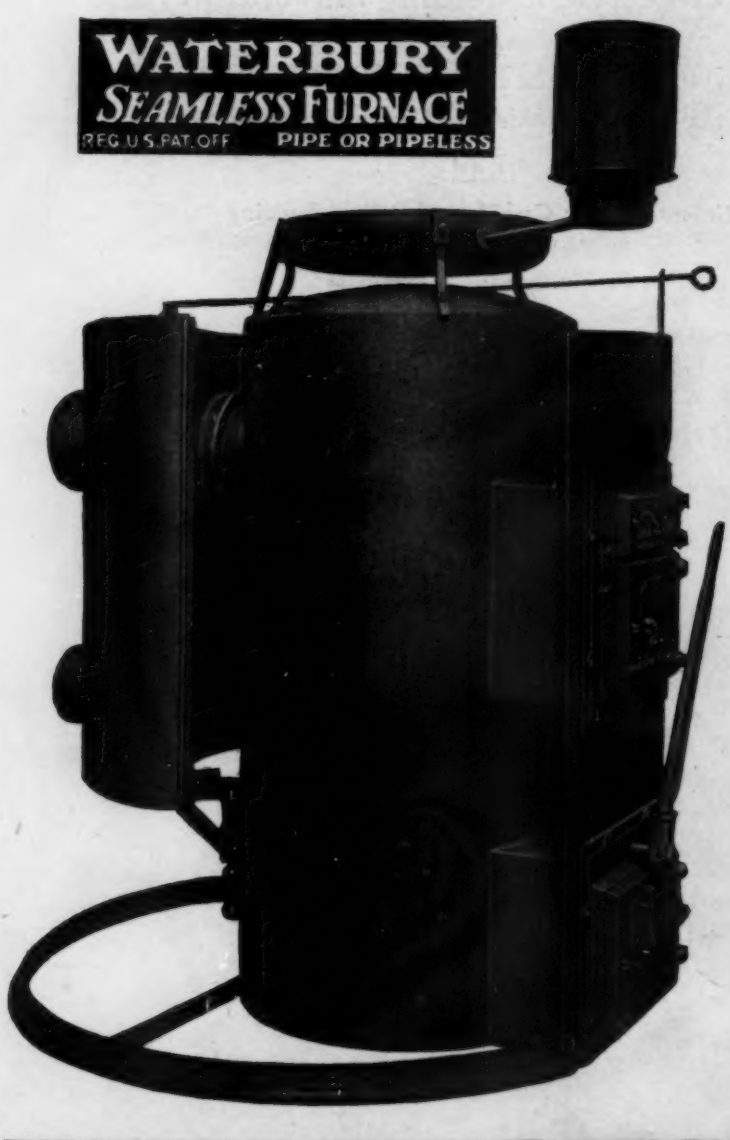

—Heavy welded steel body
—Front panel welded directly to feed and ash chutes
—No cement, no rivets—no calking
—No cast iron joints
—Absolutely gas-tight for life of furnace

A Real Humidifier

—Controlled moisture
—Greater evaporating surface
—Centered over fire dome
—Evenly distributed humidity
—Automatic at small cost

Other Waterbury Features

—Large combustion dome
—Full sized radiators
—Certified Standard Code capacity

Easier to Install

—Door frames come all bolted to front
—Only the doors to slip into place

NO furnace of lesser quality attracts the profitable trade that only the Waterbury can satisfy. Write for our proposition.

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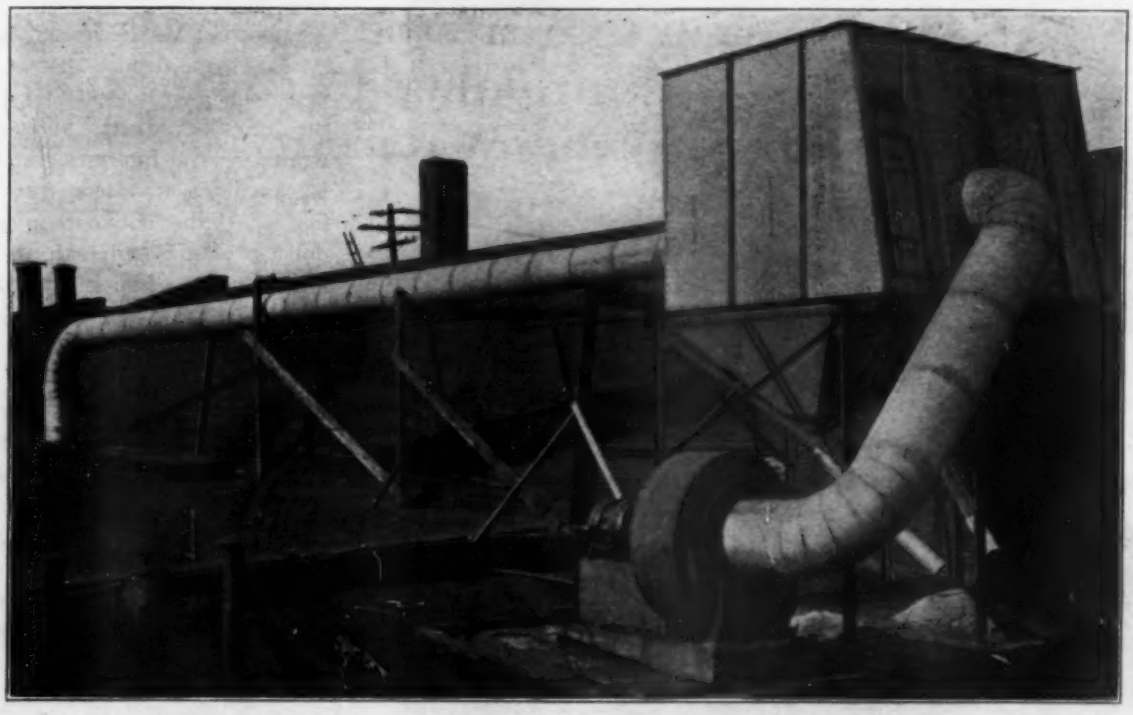

Dust Collector on the Roof of the Elevator Supplies Company, Hoboken, New Jersey

Sheet Steel Plays Big Part in Construction of Dust Collecting Systems

Efficiency of Man and Machinery Increased Where Atmosphere Is Free from Dust

NO EXTENSIVE argument is needed to convince man of the ruinous effects of dust. He knows that it injures nearly everything it touches, workers and machinery included. It irritates eyes and lungs, darkens windows and ruins machine bearings. It slows down activity and runs up manufacturing costs.

In the activities of grinding, tumbling, sand blasting, polishing, crushing, dry mixing and packing, the formation of dust in excessive and objectionable quantities is particularly noticeable. And to the extent that manufacturers are aware of the inefficiency caused by the dust-laden air that is breathed by their employees, the former are employing means to reduce as much as possible the amount of dust in the air in their plants. The action of the manufacturers is not prompted by the spirit of benevolence entirely. It is a business proposition. It means lower insurance rates. It means greater economy in machinery repairs. It means greater efficiency of workmen.

It is not surprising then to find that much time and thought have been spent on the development of dust collecting systems, the size and elaborateness of which depending upon the needs of the manufacturing plant in which the system is to function.

The accompanying illustrations show the prominent part which sheet steel has taken in the production of dust collecting systems and in particular that which the American Foundry Equipment Company, Mishawaka, Indiana, has erected for the Elevator Supplies Company, Hoboken, New Jersey.

The production of the Elevator Supplies Company consists largely of castings which require dusting. But the work of dusting has been so scientifically and successfully accomplished that very little if any dust accompanies the operation. The castings are placed inside of a metal container having a down draft rushing through it. As the moulding dust is blown off the castings by

means of a sand blast, it is carried down through the floor and disposed of in the system of dust collectors. The housings of these dust collector systems are made of galvanized steel sheets.

Interior of Elevator Supplies Company Plant Showing Room in Which Castings Are Dusted

The dust collecting screen container, which is made of galvanized steel sheets, is 8 ft. 4½ in. high and 7 feet wide. It is so arranged that the sand or abrasive used in the blast is cleaned and filtered and returned for reuse.

The Policyholders' Service Bureau of the Metropolitan Life Insurance Company makes the following comment on this type of dust collector:

"The most satisfactory equipment developed for eliminating fine dust its that which employs the principle of passing the dust-laden air through a series of screens. The important factors are slow velocity of the air and a very fine mesh screen or bag. Slow velocity of air may be obtained by using a large screen area and a fan designed to secure the required velocity of air through the system. The fan should be attached at the end of the system, pulling the air through and not driving it. The velocity recommended by the Bureau of Industrial Hygiene is two-cubic feet of air per minute against each square foot of screen area."

Milwaukee to Plug Hard for 1929 National Sheet Metal Convention

Minutes of Master Sheet Metal Contractors' Association of Milwaukee for May.

The meeting was called to order with President Reinke in the chair and twenty members present.

Before proceeding with the regular meeting, Mr. Ferguson of the Milwaukee Association of Commerce spoke briefly on having the convention of the Sheet Metal Contractors in Milwaukee in 1929, and expressed his opinion as to how much help the association could give to put it across. He also spoke of the various costs connected with it. All publicity work, registration, housing, providing of meeting halls, etc., would be taken care of by them. He asked that the matter be thought over and, if possible, to advise him before the Cleveland convention took place.

Following Mr. Ferguson was Geo. A. Bowman, deputy district attorney, who gave a splendid talk on the duties of a district attorney. He related several interesting stories of blackmail cases where their office has saved the public thousands of dollars. He closed with an invitation to call on him at any time for advice on legal questions that are within his jurisdiction.

A motion was made and carried that the amount of dues be omitted on all future bills sent out and that a schedule be stamped on showing the rates for amount of business performed, leaving the total amount to be filled in by the member.

After much discussion about the national convention being held in Milwaukee in 1929, motion was made and carried that delegates be instructed to get the next national convention to Milwaukee.

Motion was also made and carried that L. F. Reinke be appointed delegate to represent our local at the national convention.

As many matters of importance have been coming up that require action of an executive committee, motion was made and carried that the following members be elected to act on the committee: E. B. Tonnsen, A. Schumann and R. Jeske.

Mr. Jeske presented an interesting case of inefficiency of the school board. In order to repair the gutters on the 15th and Hopkins Street School, the school board had a large and expensive scaffold built from the ground up, four stories high, when ordinary gutter brackets would have been sufficient to take care of this work. Motion was made and carried that the executive committee get photographs of this unnecessary structure to have on file, and also write a letter to the school board protesting against these methods.

ONE-THIRD OF ALL RETAILERS ARE ON THEIR WAY OUT!

Census of Distribution Conducted by U. S. Bureau of Census, Brings to Light Some Startling Facts

By E. M. West*

AN ELIMINATION of one-third of all retail outlets in the country is virtually inescapable. Moreover, one-half of this third will pass out in the next few years. This is a prediction supported by facts and statistics by E. M. West, writing in *Advertising & Selling*, April 18, 1928.

The other half may hang on for another brief period of slow attrition, continues Mr. West; it will be the less fortunate half.

The half that passes out quickly will pass out with little pain.

They will find themselves more profitable employment, to the great advantage of the common weal and to their own advantage.

The half that lingers will find the process painful—and may find serious difficulty in readjusting themselves to the then condition.

Events are moving irresistibly to this consummation, nor can they be stopped or even stayed for long.

This fact has been recognized by a few of the more far-sighted who have studied the commercial fabric closest. They have even talked of it publicly—usually in predictions that chains eventually would control all retailing.

But the devastating truth was not established irrefutably until the facts developed by the recent Distribution Census of eleven cities were analyzed.

Then it appeared in startling colors—breath-taking in its far-reaching implications.

Incidentally, the eliminations will not be the result of chains; rather, the chains are the result of the conditions which will bring about the eliminations.

Consider these facts:

28.70% of the retail volume of business in the eleven cities covered by the Distribution Census, conducted by government agents from the Bureau of the Census, was done by chain store units, which numbered only

15.10% of all of the retail stores in these cities.

71.30% of the retail volume of business in the eleven cities was done by individual stores, not associated with chains, or at least reported to be conducted independently. These stores numbered

84.90% of all the retail stores in these cities.

28.06% of these individually operated stores did an average weekly volume of only $43.47. Their aggregate total volume was only

1.68% of the 71.3% of the retail volume done by the individually operated stores.

These stores which average a weekly sale of only $43.47 could not purchase more than an average of $35 weekly from all of the salesmen of all of the manufacturers and wholesalers who seek to sell them stocks.

There is no possibility of this volume of sale paying for the necessary expense of these salesmen's calls, to say nothing of other handling costs.

The excess expense must be paid for out of profits earned from other operations.

In other words, these stores are being supported out of the limited working capital of manufacturers and wholesalers.

When manufacturers and wholesalers realize the extent to which they are contributing from their limited working capital to support these outlets which serve no useful purpose, they will cease to try to sell them.

When they do, the retailers must go out and do their own buying, which will be an impossible undertaking, and they will have to quit.

How soon this will come about will depend upon how soon the manufacturer will wake up to the futility of selling at a loss to maintain an insupportable volume of sale.

In addition to this 28 per cent of the stores which sell only $43.47 average each week, there are:

18.50% of these individually operated stores which did an average weekly volume of only $139.86. Their aggregate total volume was only

3.56% of the 71.3% of the retail volume done by the individually operated stores.

Here, in the two classifications, we have 46.56 per cent of all the individually operated stores, but representing a total volume of only 5.14 per cent of the 71.3 per cent of the total volume which individual stores do—or 3.66 per cent of the total market.

A consumer sale of $139.86 a week cannot represent a stock purchase of $110 a week. Not many salesmen's calls can be paid for out of a $110 bill of sale. It won't pay much handling, or transport, or storage, or credit, or collection expense. And these are not all the charges that have to come out of it.

So, it is inevitable that most of these transactions through these stores would be entered in red if all of the legitimate charges against them were duly entered.

Yet, almost one-half of the stores, other than chains, fall into this classification.

It would be odd if, in this day of shrinking margins of profit, two-thirds of this half go out of business because wholesalers and manufacturers decline to carry them any further.

What has kept these businesses going as long as they have is the failure of the individual to apply generalities to his particular business.

There is no expression more frequently heard than, "But our business is different."

Let us see how different these businesses are.

Among dispensers of food, in this minimum class, averaging $43.47 a week for all stores, are:

27.42% of the grocery and delicatessen stores,

28.60% dairy and poultry product stores,

16.09% bakery product stores,

11.64% meat, poultry, fish stores,

35.09% fruit and vegetable stores, and

25.61% of the restaurants, which serve all these products in meals.

20.00% of the men's clothing and furnishing stores,

19.92% women's clothing stores,

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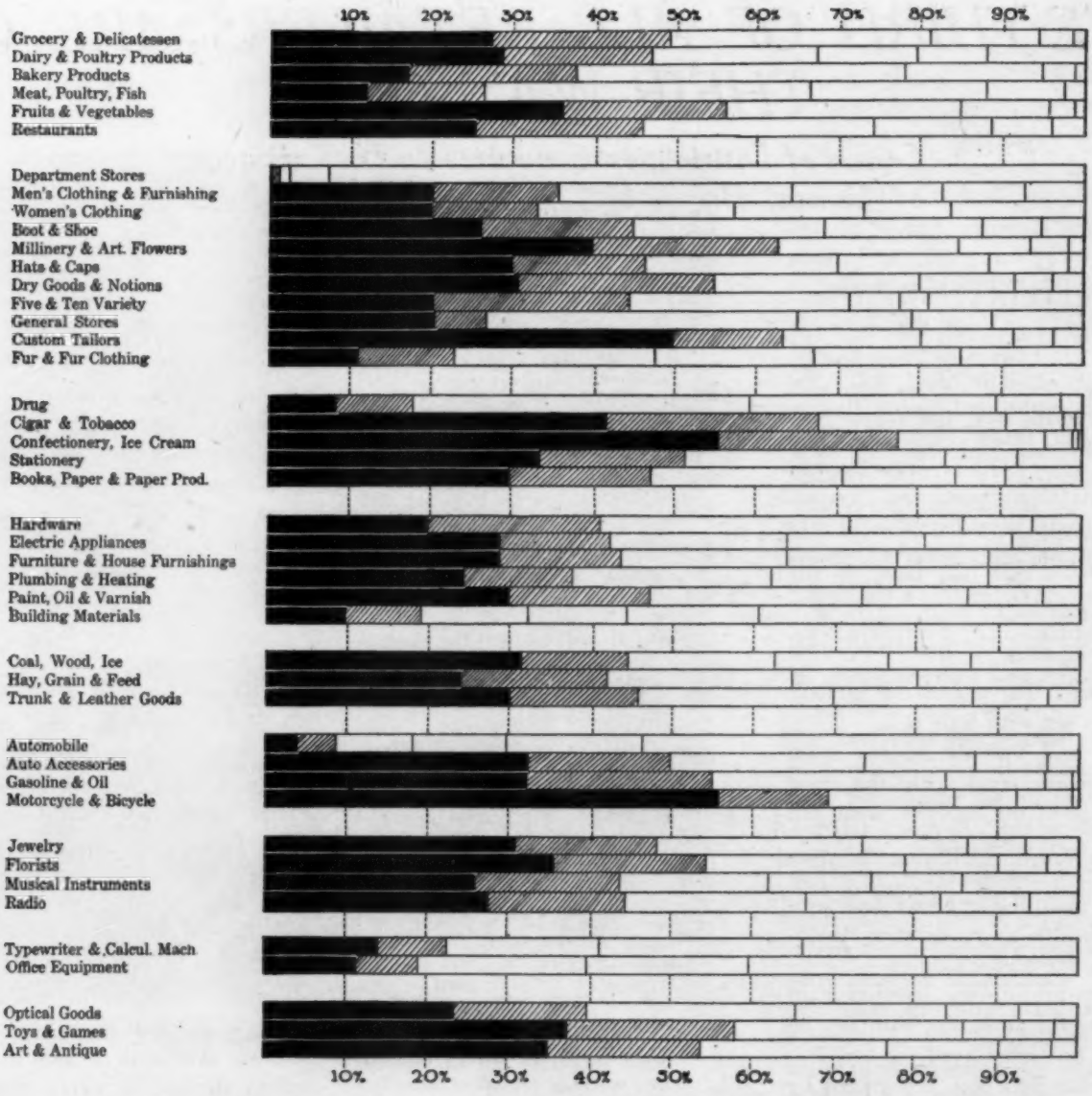

Who Is Paying the Loss?

OF THE stores in the eleven cities canvassed by the Bureau of the Census (which called on all retail outlets) over 28 per cent averaged less than $44.00 a week total sales.

Sales figures for individual stores were not obtainable from the chain store systems, which reported with a single sales total for all of their outlets. The chain stores are therefore not included in this breakdown of store volumes.

The proportion represented by these small volume stores in each of the 44 major types of retail stores is shown graphically above by the length of the solid black areas. This proportion of the stores of the different types of outlet cannot buy more than a total of $35.00 a week to pay the cost of calls of all salesmen sent to them by wholesaler and manufacturer.

Who pays this disproportionate expense?

26.64% boot and shoe stores,
39.73% millinery and artificial flowers stores,
29.59% hat and cap stores,
30.92% drygoods and notion stores,
20.12% five and ten variety stores,
20.31% general stores,
49.49% custom tailors, and
11.66% fur and fur clothing stores.

Among the convenience stores, all but the drug stores show exceedingly large proportions in this minimum class of outlet. Their figures are:

8.15% of the drug stores,
41.38% cigar and tobacco stores,
55.00% confectionery, ice cream and soft drink stores,
33.14% stationery stores, and
29.63% of the book, magazine and paper product stores.

Even among the heavier lines, save only building materials, the

Does Even the Second Class Pay Its Way?

OVER 18 per cent additionally of the individually operated stores in the eleven cities canvassed by the Bureau of the Census averaged less than $140 a week total sales.

This 18 per cent, added to the 28 per cent which averaged less than $44.00 a week, aggregates over 46 per cent which averaged less than $82.00 a week.

Sales for individual chain units are again not included in the figures.

The proportion of each type of retail outlet which sells less than $140 a week is shown above by the gray shaded areas. The proportion which together sells less than $82.00 a week is shown by the aggregate of the gray and the black.

same general condition prevails. Their figures are:

19.85% of the hardware stores,
28.13% electric appliance stores,
28.44% furniture and house furnishing stores,
24.23% plumbing and heating supply stores,
29.62% paint, oil and varnish stores, and
9.64% of the building material supply stores.

The automobile, naturally, escapes, due to the large unit purchase, but 4.07 per cent of the automobile agents average only $50.56 a week.

Among automobile products, accessory stores show 32.67 per cent in this minor classification, gasoline and oil stations show 32.42 per cent in the class, and motorcycle and bicycle stores show 55.26 per cent in the class.

Other lines betray exactly the same conditions, excepting only sellers of typewriters and calculating machines and of office equipment—usually large unit purchases.

Still, many individuals will incline to say that they are not affected by the prevalent conditions, "since we distribute through the jobber; it is the jobber's problem."

If they distribute through the jobber, it is more their problem than if they sold direct to the retailer.

For the jobber's business—his survival—depends upon his ability to control this condition that has been sapping his strength; trying to supply units which order impossible quantities of diversified items compelling him to carry stocks he can not support.

Most of the jobbers are fed up with the theory that they can sell private brands in any worth while quantity to these impossible retail outlets and reap a larger margin of profit on the unit of sale.

Most of the jobbers have recovered from the illusion that they can subsidize a small manufacturer and reap a manufacturing profit on top of their wholesaling profit.

Most of the successful wholesalers have determined either to confine themselves to wholesaling, or to transform themselves into manufacturers, or to expand themselves into chain systems.

Anyone of the three courses, faithfully pursued to the exclusion of any hybrid operation, has proved successful.

The wholesaler who transforms himself into a manufacturer steps into the position of the manufacturer who sells direct to the retailer and performs his own wholesaling function.

The wholesaler who transforms himself into a chain system continues as a wholesaler with controlled outlets.

For that, essentially, is what a chain system is.

It is not, in reality, a retail organization, but a wholesale operator with controlled outlets which enable it to operate a capacity wholesaling business, because the flow of goods through the retail outlets is accurately co-ordinated with consuming demand, permitting working capital to turn rapidly enough to yield a reasonable profit on the investment of time, money and energy.

The wholesaler who has determined to confine himself to wholesaling has reorganized his operations so as to eliminate unprofitable territory, unprofitable accounts and unprofitable items in his inventories.

In this matter of chains, the distribution figures present some very striking conditions that give further food for thought.

Among the food outlets, chains do the following percentages of the total volume of business done at retail:

44.00% dairy and poultry products.
41.30% grocery and delicatessen.
33.64% restaurants.
14.24% meat, poultry, fish.
11.40% bakery products.
9.52% fruits and vegetables.

Among the dispensers of clothing:

51.81% boots and shoes.
51.70% hats and caps.
36.88% millinery and artificial flowers.
33.02% department stores.
29.66% general stores.
18.98% men's clothing and furnishing.
15.61% women's clothing.
11.18% fur and fur clothing.
8.24% drygoods and notions.
3.32% custom tailors.

The Five & Ten Variety stores, which were classed in this group, show 70.72 per cent of the total volume done by chains.

Among the convenience stores:

35.53% cigars and tobacco.
29.86% drugs.
27.73% confectionery, ice cream, soft drinks.
15.04% stationery, books, paper and paper products.

Among the building material stores:

32.82% furniture and house furnishings.
29.29% electric appliances.
15.66% paint, oil, varnish.
15.07% building material supplies.
9.18% hardware.
9.09% plumbing and heating supplies.

In the automotive field:

73.46% gasoline and oil stations.
31.31% automobile.
19.29% automobile accessories.
4.46% motorcycle and bicycle.

One characteristic illustrated by these figures is that the chain has not usually played an important part in a field in which big units or heavy bulk or heavy weight products are predominant.

In other words, the chain is not attracted to any line which requires a widely diversified and large investment in inventories of slow moving items. Nor is it interested usually in lines where the proportionate expense of transport or storage is relatively high.

The chain has grown out of and thrived on controlled stocks, which are rapidly moving and in general demand, where the consumer volume can be measured accurately and can be satisfied with certainty.

The chain is a device to accelerate a rapid flow of products from a warehouse that can be organized, on regular scheduled deliveries, to feed to retailers stocks that require little selling effort or attendance in a store.

These stocks should impose easy requirements for storage, counter and shelf space in proportion to the dollar volume of business done, for rentals are relatively high in locations where volume can be expanded, so storage and display spaces are expensive to maintain.

The astonishingly wide prevalence of chains among these major types of stores is one of the unexpected revelations of the Census.

These figures do not tell the whole chain story.

Many of these individual stores, which are reported to be independently run, are affiliated with chains through part ownership, through

buying syndicates or other similar group activities.

If their connections were ascertainable, it would, no doubt, swell very materially both the proportion of the number of chain outlets and the volume done through chains.

One fact regarding chains should not be overlooked:

There is no more similarity of methods among chain systems than there is similarity of methods among other classes of merchants.

The difference in policies of chains are as wide as the differences in point of view among any other equal number of individuals, be they manufacturer, distributor, merchant or engaged in other employments.

To class them together in one group is to miss the first essential in dealing with them successfully.

If there is to be wide elimination among retailers, as these Census figures indicate, it is necessary to discover what are the conditions precedent to the successful development of chains.

There are facts in the Census figures bearing on these considerations:

First: The average volume of the chain unit is $1,466.23 a week.
The average volume of other stores is $725.83 a week.

It follows that the successful development of the chain unit diverts the trade of two individual units—unless we presume that the chain volume is derived from *new consumption, newly created.* This we may not presume from any evidence at hand.

On the contrary, it is demonstrated that the chain unit seeks assurance of a minimum volume of business before it establishes itself in a locality.

The management of the chain system seeks only localities which are proved to have, or reasonably may be presumed to have, this expectancy of volume. To illustrate:

There are eight chain units among 529 grocery outlets in a certain postal district in Chicago, in which 27,238 families live, paying an average monthly rental of $13.34.

There are 64 chain units among 139 grocery outlets in another postal district in Chicago, containing 22,736 families, paying an average rental of $68.10 monthly.

In the one case there is one store for every 51.5 families; in the second case, there is one store for every 163 families.

Where there are more families per store of higher spending capacity, 46 per cent of the outlets are chain units; where there are fewer families per store of lower spending capacity, 1.5 per cent of the outlets are chains.

This tells the story of discrimination in location, according to the potential consumption of an area.

To illustrate another phase:

There is no similarity of stock carried in two stores of a United Cigar Store chain, if the character of the localities served by these two stores differs widely.

The stock in a high surplus income locality will bear no resemblance to the stock in a low surplus income locality, though it carries many brands in common.

To discuss here the many phases of this discrimination in localities would require space that is not available.

In the Census figures are two primary facts which have a bearing on locations of stores:

The average number of persons per store, of all types, is 72; the average per capital volume for all stores is $621.82.

The number of persons per store for each type of store and the per capita sales for each type of store may be calculated readily from the figures in the Distribution Census.

Both of these factors enter into the question of what is the number of outlets of a given type, of a given volume, which a given neighborhood or a given area can support.

This can be calculated, with certain refinements introduced from other sources of accurate information, with a reasonable degree of assurance.

With these data it is possible then to discover what stores of a type already exist in a locality, what are their characteristics, and to foretell with reasonable assurance which are likely to survive intelligent competition, which is sure to invade any locality where the consumer potentiality is developed insufficiently.

There is much to be learned from these Census compilations by a study of inventories.

The subject is too complex to be treated within the limits of this article.

Its interest and pertinence may be indicated by a few figures for some of the principal types of stores:

For all stores.....	93,928	
the average inventory is		$6,763.30
Grocery	20,886	2,318.41
Drug	4,397	7,792.22
Hardware	2,472	10,081.68
Department	127	968,873.30
Dry goods	3,290	9,705.14
Men's clothing	2,834	15,808.22
Women's clothing	1,672	11,940.97
Boots and shoes.....	2,030	13,283.40
Hats and caps.....	255	5,578.82
Millinery	1,107	1,916.35
Five and ten variety...	365	21,657.54
Cigars	3,280	1,761.37
Confectionery	6,677	777.56
Automobile	1,018	35,259.63
Accessories	2,077	5,275.25
Furniture	2,844	18,258.05
Electrical	750	10,506.00

The number of employes in different types of stores is another subject that has significance, particularly the division between selling employes and other employes not engaged in selling.

Add to these figures the wages prevailing and the seasonal variation in both categories; you have then a further subject of profitable investigation.

We will not give these details here for lack of space, and for the added reason that the intention of this article is to point out the valuable and significant character of this Census compilation, as well as to suggest further lines of inquiry and possible applications of the facts, rather than to assemble the facts themselves.

We feel we have presented enough to indicate the valuable contributions that have been made by this limited compilation, which embraces one-eighteenth of the total consuming public in the country.

With the prospect of a nation-wide assembly of distribution facts, incident to the forthcoming National Census in 1930, there is promise of

Deadlock Broken, Section 5 Uniform Mechanics' Lien Act Revised

SECTION 5 of the proposed Uniform Mechanics' Lien Act is definitely slated for revision, according to a vote taken on a new proposed substitute section submitted to the Standard State Mechanics' Lien Act Committee of the Department of Commerce at Washington, D. C., April 25.

The suggested amendment to the proposed act, in the form of a substitute for the present proposed Section 5, was submitted by William B. King, an attorney of Washington, D. C., who is a member of the committee. So vast an improvement was the new draft of Section 5 over the previous proposal that all the opponents of that section, namely the representatives of contractors, architects, engineers, financial interests and building and loan associations, at once swung behind the King proposal and gained the additional support of representatives of other interests.

Deadlock Is Broken

What amounted to a deadlock was thus broken. The original Section 5 is definitely abandoned and a new Section 5 with many admirable features takes its place by a vote of 7 to 2, with the proponent of the substitute section not present, with the chairman not voting, and with two members of the committee not present or on record. It is, therefore, evident that the deadlock of 6 against 6 has been changed, with the stand taken by the contractors for revision now upheld by a decisive majority of the committee members.

Despite the fact that there is no provision in the substitute section making it mandatory on every lienor to file a notice of intention to lien before lien rights become effective, this omission is made up in part by other provisions, which so allocate responsibility between owner and general contractor that the proposed section will be an effective safeguard to the industry if enacted.

Contractors have reiterated their

Section 5 as Revised

Section 5.—The owner shall at all times retain an amount equal to ten (10%) per cent of that portion of the contract price, or if there is no contract price, of the value represented by labor or services performed and materials furnished to date on which any payment is made to the contractor. Such 10 per cent of the contract price or value shall not be payable to the contractor until the expiration of 30 days after the date on which the building is substantially completed. Before payment by the owner to the contractor of the final amount due, other than the retained 10 per cent of the contract price or value, the contractor shall furnish to the owner a statement under oath showing in a lump sum the amount due or to become due to laborers directly employed by him for labor or services performed, the names of every subcontractor and material man directly employed by him, and the amount, if any, which is due or to become due each for labor or services performed or materials furnished. Upon receipt of such statement, if the retained 10 per cent of the contract price or value is insufficient to pay all such amounts shown by the statement, the owner may retain in addition thereto an amount sufficient to pay the difference between such retained 10 per cent and the total of such amounts shown by the statement and may pay such amounts in accordance with the respective rights of the subcontractors, material men and laborers unless the contractor procures and furnishes to the owner waivers of liens therefor. Any payment so made shall reduce to the extent of such payment the indebtedness of the owner to the contractor. Such final payment made by the owner to the contractor without receiving such statement under oath or without retaining, after receipt of such statement, sufficient money from such final payment to pay such difference or without procuring such waivers shall not reduce the liens of such subcontractors or material men or of the laborers whose individual accounts constitute a part of the lump sum shown, except to the extent of any portion of such payment actually received by such subcontractor, material man or laborer. The contractor shall have no right of lien or right of action against the owner or account of his contract until the statement herein provided for is furnished.

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an accurate guide to economical distribution in the near future.

With an accurate guide to consumption, there is the possibility of an accurate regulation of production, eliminating some of the speculative production which is undertaken through the urge of a hope or a hunch, with inevitable unsettlement when the guesses go badly astray.

Through such correlation of production with consumption, with an index of the profitable rate of flow through the different types of outlets and the different channels of distribution, there is every reason to expect such a fundamental improvement in commercial practices as will do more to assure a wider spread of prosperity than any conceivable stimulation could produce in the absence of reasonable proximate measurements, such as this Census affords.

opposition to any lien law that did not require filing a notice of intention to place a lien. The unwavering opposition of material dealers to such a provision, however, still exists and the present compromise should be studied carefully to see if this desired provision can be abandoned without jeopardizing the position of both owners and general contractors.

The division of responsibility for material and subcontract payments between the owner and the direct contractor, as provided in the new section, places a premium on the responsibility of the general contractor. If an owner voluntarily enters into a contract with an irresponsible contractor, he will be forced to assume the duties of acting as fiscal agent for the project before the final payment is made, and will not be freed from any results of his neglect and bad judgment.

Under the provisions of the proposed substitute section, the responsible contractor will not be penalized for the fact that irresponsible contractors sometimes crowd into the industry. The clauses making it mandatory on all contractors to submit a sworn statement setting forth the outstanding accounts not paid, before final payment for a project is required of an owner, is an entirely different matter from the previous proposed requirement, which would force the contractor to make such sworn statements before each payment could be collected from the owner. The previous provision forced the owner to assume complete supervision over all payments or lay himself liable for dual payment. It was an indictment of all general contractors, regardless of known responsibility, by process of legal implication.

It is important that a study of the 37 sections of the entire proposed act reveals no measure written to provide that material men shall credit money received from a contractor to the specific account covering the project from which the payment originates. This omission is a serious one. Lien laws by their nature place responsibility for payment upon the owners of specific property and improvements.

That a contractor may owe money to a dealer on past transactions and apply money received from current contracts on the old debts is not a theory but a recurrent condition. Unless the proper owner is given credit for his funds, his improvement may be saddled with liens which are improper. Bankrupt contractors who use the lien rights of material men to bolster up false credit by virtue of new contracts on hand are using the improvements of uninformed owners in a false manner.

They are doing so by virtue of current lien laws and because lien laws do not always specifically provide that funds originating from a specific project shall be credited by the material man or subcontractor, to the specific account involved. It is to be hoped that this omission will be remedied before the committee gets through revising the present draft of the proposed uniform act.

Contractors, sub-contractors and others cannot be urged too strongly to study over the new Section 5 in relation to the entire text of the proposed Uniform Lien Act. The new section, together with the rest of the draft of the law, is to be presented to the National Conference of Commissioners on Uniform State Laws, meeting in Seattle in July.

Copies of the second tentative draft of the proposed act can be secured from Dan H. Wheeler, Division of Building and Housing, Department of Commerce, Washington, D. C.

Wisconsin Sheet Metal Men Stop Practice of Mfgs. Selling Direct

The Wisconsin Sheet Metal Contractors held a meeting in Milwaukee recently.

The meeting was called to order with the following members present: C. C. Tolg, Paul Biersach, L. F. Reinke, Aug. Zindars, Otto Geussenhainer, H. Geussenhainer, W. Gehrke, Chas. Pansch, R. Jeake, W. A. Belau.

Mr. Ferguson of the Association of Commerce gave a short talk on having the National Sheet Metal convention in Milwaukee in 1929 and gave his opinion as to how much help the association could give to put it across. All publicity work, registrations, housing, providing of meeting halls, etc., would be taken care of by them. He asked us to think it over and, if possible, to advise him before the Cleveland convention took place. Discussions followed and Otto Geussenhainer related some interesting experiences with conventions in his city.

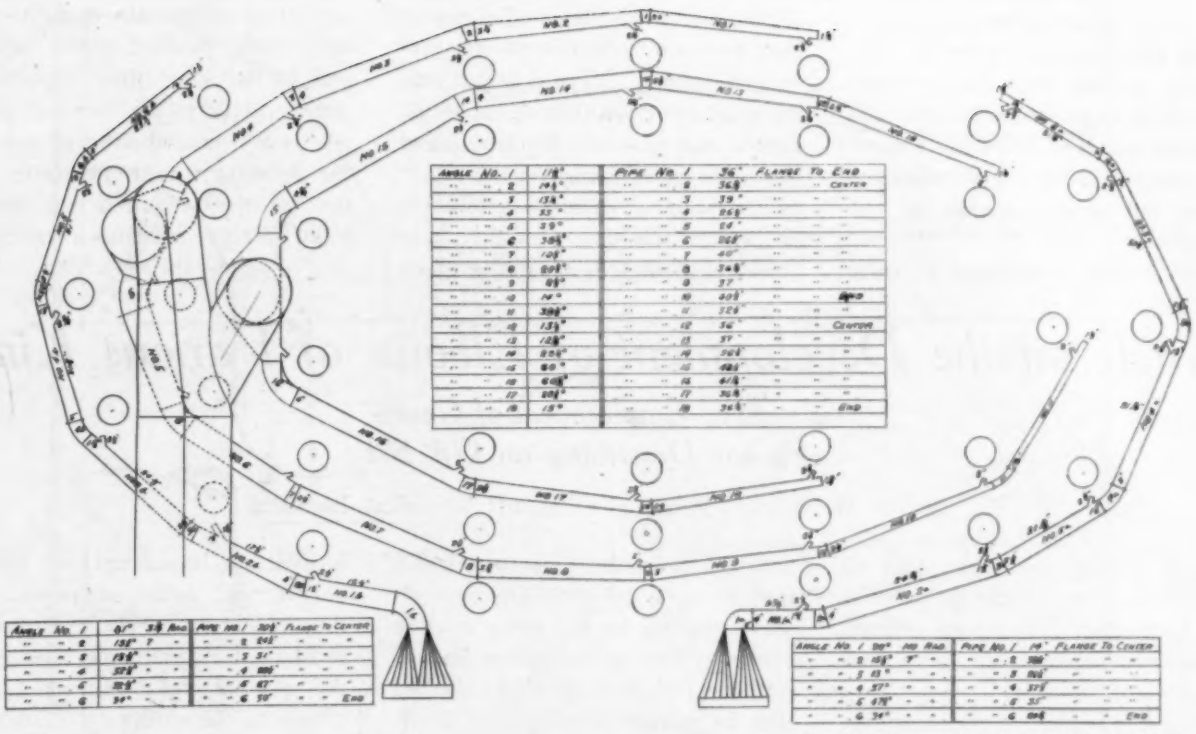
Bills for railroad fare for out-of-town members were read and ordered paid.

Chas. Pansch, Racine, and Otto Geussenhainer cited cases where manufacturers of sheet metal products, metal ceilings, etc., sold direct to consumers without protecting the sheet metal contractors, and also mentioned how they immediately put a stop to this unfair practice of manufacturers. It was the opinion of all present that should any such cases come up again they should immediately be brought to the attention of the officers, so that proper action can be taken.

Motion was made to include Wm. Gehrke of Sheboygan and Walter A. Belau to the list of delegates for the convention.

Paul Biersach spoke about the convention and read the program. He then read a letter from the office of the secretary of the Department of Commerce by Dan H. Wheeler about a government form of uniform mechanics lien law throughout the United States and asked the secretary to write to the office that our association has taken the matter under consideration and will communicate with them from time to time. Otto Geussenhainer was appointed to review this form.

Paul Biersach informed us that the next meeting of the Associated General Contractors will be held in Washington to form a code eliminating the evils of price peddling and other evils between the subcontractors and general contractors.



—Courtesy Armco Ingot Iron Shop News.

Detailed Drawing of Collecting System

Winning or Losing Big Sheet Metal Jobs on a Margin of Careful Bidding

Paper Drying Plant Requirements Tax Ingenuity of Sheet Metal Contractor

THE difference between a successful sheet metal contractor, and one that takes a chance, wins sometimes, and loses more often—is the ability to analyze a job to be done. For that is the basis of accurately estimating the material and labor required, and submitting a price low enough to be in the bidding, yet high enough to mean a reasonable profit to the sheet metal contractor.

Most of the big jobs are given out on a competitive basis, and if you are really out for big game, you must be able to see all sides of the question, and bid *intelligently*. There is the story in a nut shell.

Not so long ago, a paper company in Middletown, Ohio, found it necessary to install a blower system in one of their big machines. They let the job out for bids. The man that got it bid so low that he could hardly have purchased the metal necessary for the job, let alone, install it.

How could he take care of those bothersome details—overhead and depreciation, that must be included in every estimate? Of course, the result was inevitable. He "foozled" the job, and had to give it up. He tied up machines that ran twenty-four hours a day, and even then did not get the job into working order. He lost money; it cost the paper company money; and finally, in desperation, they turned the job over to another shop to finish.

J. E. Singer & Son, 35 S. Main Street, Middletown, Ohio, were called in to fill the breach. They assembled their information, analyzed the requirements of the job, and then figured costs.

In doing this, they worked with the engineer of the paper company, took *accurate* measurements, studied the requirements of the machine, and made recommendations to the company. It required some real study, for this drying apparatus was extremely complicated. With only the dimensions of the machine, and a knowledge of the job to be done, J. E. Singer & Son worked out the blue prints. Because the machine operates twenty-four hours a day, it was not possible to build the dryer by making up a piece and trying it on, as a tailor does.

The installation required 2,500 pounds of galvanized Armco Ingot Iron, and the whole job was made up in sections in the shop. This required thirty days of man-hours, and when the job was ready to be installed, the parts were taken to the paper plant—the machine stopped, and installation work begun. Sixteen hours later, the wheels were turning again, and the drying sys-

tem was functioning satisfactorily.

The accompanying drawing gives an idea of the intricate construction. The sections are flanged with 18 gauge material, the flanges riveted to the pipe, with 2½ pound tinned rivets, and bolted together at the sections.

The system is designed to force air onto the long strips of paper as they pass over a series of rolls arranged spirally. The nozzles lead off from the main duct at each roll, forcing the warmed, dry air against the paper as it passes over the rolls.

The paper company's efforts in developing this dryer for their machine, is typical of what the paper industry is continually doing to produce their product more rapidly, and at the same time improve its quality. This Middletown paper company is contributing its share to the development of processes and this job they required is a complicated drying system, a necessary part of one of their machines.

Article on the Development of Elbows of Various Kinds

Treats of Employment of Geometry for Describing an Off Set

By O. W. Kothe, Principal St. Louis Technical Institute

IT IS strange, but true, that all tradesmen are taught to enter at the back door of homes, offices, stores, etc.—never at the front door—if it can be avoided.

Mother teaching is the strongest trait we humans have. At home we were all taught to go to the back door of our own home as well as all the neighbors and friends. So when we grow up it is the most natural thing to always try to go around to the back of a thing—it's seldom direct, where because of the straight application, the solution is solved and the thing is underway long before the back door is reached. There is nothing worse for tradesmen than always beating around the bush to gain their objective. It is always the longest way around and it is therefore also the most expensive way. It is not uncommon that right good mechanics will wind and twine around and spend years of their life when they could as well strike out boldly and gain their advantage before you could say Jack Robinson, as the story goes.

Now let me show you what I mean; take elbows for instance—they are a most simple thing to lay out; still many sheet metal men make hard work of it. They always go around to the back door—they try to achieve a common objective in a hundred different ways. One cuts and fits until he has made something; another wants to save ten minutes in laying out accurately and then spends thirty minutes or more trimming, drifting, etc.—still another sticks the pipe in a water tank to mark the miter line cut—always figuring he can guess it close enough. And so the endless procession goes, when to spend the allotted time in correct planning and developing their work is like going to the front door where you have clear sailing afterwards.

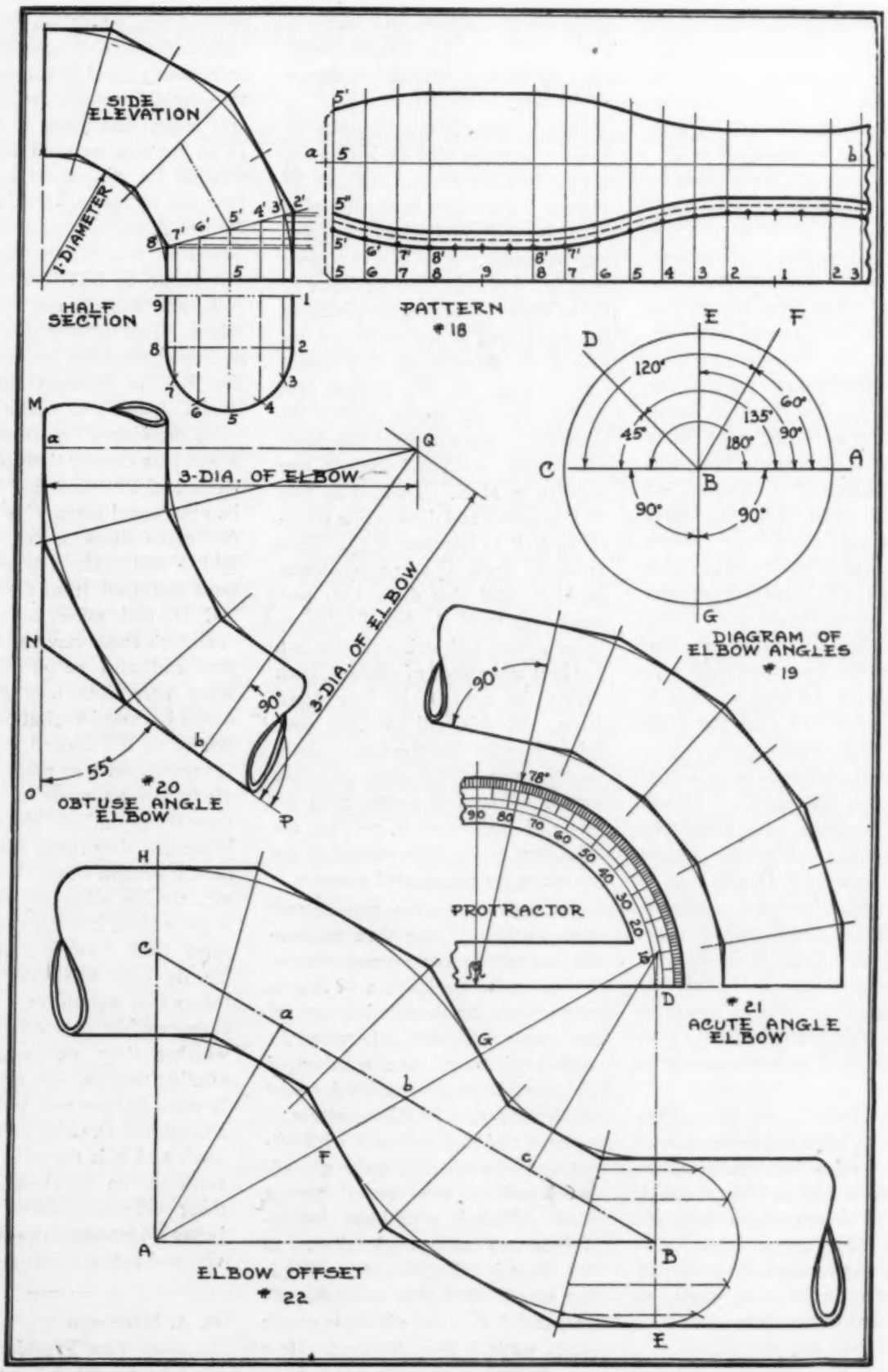
Then, too, with the basement folks—they never take the trouble to work these problems—they see them, yes, but it is junk to them; they don't know what to do with it—so what is the use bothering around with it.

Geometrical laying out is one of the greatest brain developers we know of. It trains men to project their mind's eye into unseen nooks and corners of fittings, and there visualize the construction. After this power is once developed—it can be used in many other avenues of accomplishment. That is why we always lay stress in doing things in a recognized way, using the front door instead of walking around to the back door. Elbows are nothing more than turns or bends in pipe. The same pipe must be bent around, and the cross-section of the pipe must not be changed.

In our former article of this series, we took up definite and scientific methods for arriving at miter lines, for arriving at the correct number of pieces a certain radius elbow should have, and the general procedure for developing them. In our diagram No. 18, we have an elbow made to an oblong section, like is used on breechings for heaters, boilers and other purposes. The first object is to always draw the right angle diagram, and then sweep the arcs for the throat and heel of elbow to the radius of throat and diameter it is desired. Beneath this elevation, the half section is designed, giving it length as measurements may require, and the width is made as becomes the elbow.

Observe the side elevation cannot be distinguished from what would otherwise be a cylindrical elbow. The flat portion is only noticeable in the section where the oblong is placed this way. Here the flat sides will be in the throat and heel. But if the section were reversed—that is the long side horizontal, then the flat side would be on the sides of elbow. Hence it depends where the flat side must be placed that we locate our half section. If the elbow is elliptical or some other odd shape—we simply drew the section beneath the elevation, and the rest will work out in the development.

Next divide only the curved lines of the half section in equal parts, the flat portions will work themselves in as they are. From each point as 2-3-4-5 etc. of section erect lines to intersect the miter line as in points 2′-3′-4′ etc. Now to lay out the pattern, we draw a line as 5-3 as a continuation of the base of elevation, and on this line measure off the spaces in numerical order as 5-6-7-8 etc. Observe, we start with line 5, which places our seam line



Pattern for Elbow Offset

in the center of side of elbow. This is a more workmanlike job than placing them in the throat or heel, and makes assembling also easier. Now erect stretchout lines and then from each point in the miter line 2′-8′ bring over horizontal lines to cut off stretchout lines of similar number as 5′-6′-7′ etc. Through these points draw a uniform line, and you have the pattern.

In riveted work, the development lines can be the center of rivet holes. But where rivets are not placed so closely; then every other space can

be used for a rivet hole. Lap edges must be added, and this is about ⅜ to ½ inch for average work. The middle patterns can be developed by merely picking the throat and heel lengths and setting them off as 5″-5 or 5′, and then use the pattern as a template. The line a-b is the same as the center line, or the base of the pattern, which makes it convenient to place the template pattern for marking off. The distances can also be lifted or transferred with dividers.

Elbow Angles and Offsets are also a thing that bothers many workmen. Here again most folks know how to make something, and in many instances it is all right, and in others, it could be better. Now, since all angles, elbows and off-sets are nothing more than straight pipe cut to make such angles; it becomes a simple matter to arrive at a correct miter line. Thus, in diagram No. 19, if we have a straight pipe A-C that must be bent at point B and B-G, we have a 90 degree turn, which is clear, we are sure.

But if we wish to bend pipe B-C as B-D; then the pipe A-B-D will be an obtuse angle. The measuring is then considered from the straight pipe B-C bent to B-D, and is a 45 degree angle in this case. Observe, we do call it a 135 degree angle, since the pipe angle B-D does not swing from A-B to B-D; but rises from line B-C as B-D. Therefore the angle B-D is an obtuse, a 45 degree bend, and that is what we mean by it.

Notice that the 90 degree line B-E divides what can be interpreted as the difference between an obtuse and an acute angle. Thus the angle B-F is 60 degrees from A-B, and it is not 120 degrees from B-C—that is if measuring is done correctly. Hence, in an acute angle, the pipe sweeps in the distance of A to F, and it does not sweep from C to F. Hence the distinction between an obtuse angle and an acute is important, in that it avoids confusion. We admit many workmen, and draftsmen also for that matter, show their angle measurements incorrectly; but as long as both parties know what is meant—no harm is done. However, the correct interpretation hurts no one and is always on the side of safetty.

This we show in diagram No. 20 where a straight pipe M-N-O must be bent in point N at an angle of 55 degrees. This then bends the pipe N-O as N-P and gives the correct treatment. Now if a two piece bend is too abrupt, and we desire to fill in three or more gore pieces in the angle, and if we desire the radius of the throat to equal 2 diameters of pipe, we can achieve this easily. Set dividers to equal 3 diameters of pipe and from line M-N measure as at Q and draw a line parallel to M-N. Then from line N-P measure and draw a line parallel to N-P to intersect at Q. Then from Q draw Q-a, perpendicular to M-N, and also draw Q-b perpendicular to N-P. Set dividers to Q as center and strike the arc a-b for heel and throat of elbow. Then divide the arc a-b in four equal parts, and this will establish your miter lines for the three gore pieces in this case. This same principle can be followed no matter what the angle of the obtuse is, or what the diameter, or what the radius of the throat or the number of pieces.

But where an acute angle is met with as No. 21, we then measure the degrees in the manner shown. This is quite similar to a 90 degree elbow, only the degree line cuts off the quadrant. But otherwise the radius of throat, the number of pieces and the pattern development is identical to a 90 degree elbow.

Now and then we meet with off-set angles, such that make a graduated off-set, not one of abrupt kinks. This is a problem that involves two acute angle elbows as we show in No. 22. Here A-B is the length allowed to make the off-set, and A-C is the off-set in center lines, while C-B is the slant. Now an off-set like this can be made in numerous ways, but we believe the way we show is the most practical as well as in relieving friction.

The geometry for describing an off-set is used in this case. Here the line B-C is divided into 4 equal parts, giving points a-b-c. Now at right angles to C-B square out lines from points a and c as shown, which will establish centers for describing arcs in heel and throat as at A and D. In our case we used a 30 degree triangle for the off-set and therefore the radius centers fall in the corners A and D. But where this off-set is changed; the centers will fall above or below the base line A-B, and will always make themselves. That is why they must be squared perpendicular to the slope line B-C to intersect the vertical lines C-A and B-D where they will.

By drawing a line from A to D, it will pass exactly through the center b, and will subdivide the off-set into two equal parts. This will make two acute elbow angles, as shown by E-F and G-H. The arcs are for same described from the centers A and D, and miter lines are also drawn to these centers. The pattern can also be developed, but space here does not permit, and would be done identical to other examples on this order.

Possibly why so many thousands of tradesmen really never "think these things out" or "clear through," is because they spend their lives on mostly straight work. When angles, etc., are met with, they simply chop it out as best it will go and then resume their former routine again. To do over and over again the things that were learned as apprentices certainly proves to any person whether they are progressive or whether they are just marking time. It takes 100 per cent ambition to be a master of Drafting and laying out work and it is the most interesting work in the world—always something different; always something better to accomplish—it puts pep, vim and courage into a person.

D. A. Merriman Becomes Vice President American Steel & Wire

Dennis A. Merriman, general sales manager and a director of the American Steel and Wire Company, Chicago, has been made vice-president. He will continue as general sales manager.

Allied Construction Industries Committee Begins Attack on False Credit

Committee, Consisting of General and Sub-Contractors, to Stop False Credit Before Granted

As a first step in the elimination from the construction industry of sharp business practices, such as bid peddling, price cutting, excessive back charging, last minute bidding, withholding of subcontract payments and other such procedure, a direct attack on the basis of false credit is to be made by both general contractors and subcontractors. This was the decision arrived at jointly at Washington, D. C., May 8, at a meeting between representatives of nationally organized subcontractors' associations and the Executive Board of the Associated General Contractors of America. At this meeting were representatives of the National Association of Building Trades Employers, the National Association of Builders' Exchanges and of other interests, who were present either to take part in or to observe the proceedings.

The joint committee of subcontractors and general contractors who presented two objectives to the conference in Washington were instructed to proceed with both the plan for the inauguration of credit associations in the building trades and with the formulation of a code of standard practices for the guidance of all contracting elements in the construction industry. The joint committee which formulated its tentative program in Chicago on May 8 named itself the Allied Construction Industries Committee.

Study Standard Business Codes

This committee is gathering together the various codes of ethics and of standard practices which have been devised in the various trade associations of contractors and will compile a tentative universal code of standard practices for submission to the various contracting organizations for criticism, revision and approval. Credit associations are to be formed in a number of cities with the cooperation of the vendors of materials and supplies and destructive competitive conditions are to be attacked at their roots, which it was decided lie in the lack of or the looseness of credit policies in the construction industry.

Basing the decision to inaugurate an active campaign to establish credit associations on the proposition that each unfair, unbusinesslike or unprofitable practice prevalent in the industry can be traced back to unwarranted credit granted to large numbers of contractors in every trade and division of the industry the committee, with the concurrence of the Executive Board of the Associated General Contractors of America, decided that before the effects of loose credits can be corrected, credit in the building industry must be put on a sound basis.

Injure Contractors and Material Men

It was pointed out that the contractor who cut his bids repeatedly in order to get work at any price, and in the process of carrying out commitments relied on the credit granted by material dealers and manufacturers, represented the demoralizing element in every trade and amongst the general contractors. The competitive conditions thus established by those supplied with unwarranted credit set the pace for the entire industry, it was pointed out, with the result that reputable contractors in all trades and groups found themselves forced to participate in the use of false credit, engage in undesirable practices and imitate the methods of the irresponsible if any volume of business is secured.

It was agreed that any material concern that was carrying the past due accounts of contractors who indulged in price cutting, sharp practices and demoralizing bidding were enabled to do so only because a certain proportion of the reputable contractors were paying their bills promptly and thereby supplying the funds that allowed unwarranted credits to be granted to those responsible for the conditions which must be checked if the industry is to recover and get on a profitable basis. Believing that any necessary program should be attempted by those to whom the work is most necessary, the Washington Conference decided to act to bring the various groups involved in the sale and purchase of commodities used in building into credit associations formed locally in cities where present indications show that such a move will be welcomed, once it is energetically initiated.

The Allied Construction Industries Committee thus becomes a permanent ways and means committee, dedicated to the task of uprooting the recognized bad practices of the industry, and of developing cooperation between general contractors and subcontractors, to the end that both may economically develop their special fields through utilization of the particular abilities of each. It becomes for the present a promotional committee for the establishment of local credit associations wherever local trade groups or local aggregations of construction interests are to be found willing or desirous of operating on a sound credit basis.

To extend the sound business policies relating to the granting of credit to as many trades or groups in the industry as can be interested locally in such a program, it was decided that it was first necessary to form a local credit association committee composed of representatives of organized contractors from each branch or trade. The procedure as outlined involves the presentation

of the plan to the dealers or manufacturers selling materials and supplies to each trade involved in such a manner that the majority of the reputable dealers will agree to submitting detailed reports of their sales transactions to a central association of credit men, preferably composed of each dealer's own credit executive, with these credit men organized as a branch of the National Association of Credit Men.

Stop False Credit Before Granted

Once the standard credit terms of cash discount, net payment and cash on delivery of goods are reestablished as current policies of the firms participating in the credit association so formed, the desired results of curbing false credit become achieved through the routine working of the activities of the credit association. These routine activities consist in common practice of the detailed pooling of monthly or bimonthly data covering sales transactions, and the compilation of the unpaid obligations of each customer who has not conformed to the established and customary terms of sale and payment. A contractor buyer showing up consistently as not meeting his bills will automatically be placed on the permanent list of cash customers of the firms subscribing to the credit bureau or association.

It appears that both subcontractors and general contractors who discount their bills furnish the basic income which all material dealers must have and use in their business policies, whether these are good, bad or indifferent.

Therefore when reputable and financially sound contractors vigorously unite in the promotion and maintenance of credit associations designed to relieve the dealers of a staggering burden of past due accounts, a definite incentive and driving force is given to the movement that is lacking when contractors remain aloof from this basic problem. Individual selfishness, expediency, short sightedness, harsh competition and lack of energetic support are, with undue reliance on lien laws, the reasons why credit policies in the construction industry have never been strictly enforced.

The dealer who extends credit to a contractor who has incurred debts with another dealer is actuated by the same competitive instinct, short sightedness or compulsion of circumstances that cause reputable contractors to enter competition on even terms with the financially irresponsible party who has secured false credit without paying his past due bills.

The Allied Construction Industries Committee has thus taken on one of the most important programs ever undertaken by any group of contractors in an organized fashion. The committee relies on future achieved results in the formulation of standards of ethical practice and in the formation and operation of credit associations to show whether the joint movement started by subcontractors and general contractors has been justified or not.

Funds from Permit Fees in Indianapolis Causing Contention Among Furnace Men

At a meeting of the Indianapolis Sheet Metal and Warm Air Heating Contractors' Association the question came up of city permits for the installations of furnaces. The permit cost for each installation two dollars. It was brought out at the meeting that certain members were refusing to pay the two dollars and had been refusing such payment for some months, the reason being that the money paid in for permits is not applied to inspection of jobs and enforcement of proper installation. The withholding of the fee is for the purpose of bringing the issue of the proper use of these funds to the front in the hope of remedying this fault.

The warm air heating contractors do not object to the fee, nor to the ordinance under which the fee is collected. On the contrary, they favor it strongly and want to bring about its enforcement.

While the organization made no recommendation, the matter was laid before the members in open meeting, together with the fact that nothing had been done by the authorities in an attempt to collect fees, and each member was left free to make his own decision as to whether or not he would pay the fee. It was the belief of the persons putting this matter before the meeting that a refusal on the part of all or even most of the contractors to pay this fee would bring about a proper application of the fund and enforcement of the ordinance. If this can be brought about by this means or any other it will form a basis for steps toward an assurance that nothing excepting installations according to the National Code will be allowed in Indianapolis.

Friedley-Voshardt Co. to Manufacture Conductor Pipe

Friedley-Voshardt Company, Chicago, have determined to re-enter the field of manufacturing galvanized corrugated conductor pipe, according to a statement by Paul L. Biersach.

The article will be made of 26-gauge or heavier material and will be priced commensurate with a first-class product. Price lists and discounts will be issued later by the company.

The company now manufactures a complete line of art metal work such as steel ceilings, architectural zinc and copper ornaments, sheet metal statuary, stamped shower plates, canopies and chandelier fixture parts.

C. L. Patterson Resigns as Secretary of Sheet Steel Trade Committee

Clayton L. Patterson, who has been secretary of the Sheet Steel Trade Extension Committee since its inception several years ago, has resigned his position as secretary. Mr. Patterson was also the secretary of the National Association of Sheet & Tin Plate Manufacturers and he has also resigned this position, effective May 31st. The reason for Mr. Patterson's desire to give up this work and what his future plans are were not made known.

Cost of Autos for Business Is Invested Capital, Says Board of Tax Appeals

The cost of automobiles purchased for the use of officers of a corporation is considered invested capital in making income tax returns, according to a decision made this week by the Board of Tax Appeals in Washington in hearing the case of the *Moline* (Ill.) *Dispatch* vs. the Commission of Internal Revenue. The hearing was brought about by the appeal of the *Moline Dispatch* publishers from the findings of the Commissioner of Internal Revenue in connection with their tax liability for the calendar years 1918 to 1921, inclusive. It is estimated that the allowances will save the paper $2,000.

The petitioners showed that the automobiles in question were devoted to the use of the business manager and editor of the *Dispatch,* and were used to convey them from their homes to the office and to various places about the city on business, and were therefore necessary equipment in the conduct of the business. They testified that expenses were paid by the publishing company while the cars were in Moline, but that when taken on private trips expenses were paid privately.

The decision of the Tax Board also allows the expense of telephones installed in the homes of the editor and publisher of the *Dispatch* and used in connection with the operations of the paper to be included in the operating expenses of the paper. The petitioners showed that the telephones of the company were listed in the directory with a notation alongside them to call the numbers of the phones in the editor's and publisher's homes after 8 p. m.

Bonuses to employes were considered as legitimate operating expense instead of gifts, according to the decision.

John Kemper Becomes President Louisville Sheet Metal Association

A meeting of the Louisville, Kentucky, Sheet Metal Contractors & Roofers Association was held on May 10, 1928. An election of officers for the ensuing year took place at this meeting. The new officers are:

President, John Kemper, O. K. Sheet Metal Works, 1013 South Jackson St., Louisville, Ky.

Vice-President, E. Welsh, Tri-State Cornice & Roofing Co., 440 Baxter Ave., Louisville, Ky.

Secretary, Winston Johnson, American Furnace & Roofing Co., 371 Baxter Ave., Louisville, Ky.

Financial Sec., Mr. Schwartzwalder, 2917 Slevin St., Louisville, Ky.

Treasurer, J. E. Merrick, Falls City Cornice & Roofing Co., 800 E. Madison St., Louisville, Ky.

Seargent-at-Arms, Wm Fischer, 227 So. Second St., Louisville, Ky.

Linde Air Products Company, New York, Opens Sales Office at Memphis

The Linde Air Products Company recently opened a new district sales office at 48 West McLemore Avenue, Memphis, Tennessee. Other Linde district offices are maintained in 25 leading industrial centers. Users of Linde oxygen, oxweld welding and cutting equipment and supplies, Prest-O-Lite acetylene and Union Carbide in the district which consists of western Tennessee, northern Mississippi and eastern Arkansas will find this office adequately prepared to handle their needs. H. N. Smith will be district manager in charge.

Fred T. Llewellyn Becomes President, American Welding Society

Fred T. Llewellyn, engineer in the president's office of the United States Steel Corporation, has been elected president of the American Welding Society. Mr. Llewellyn came to this country from Wales in 1890. He has been identified with the engineering profession during all of the time that he has been in this country, and his zeal in carrying on the work of the American Welding Society has won for him the well earned honor of being the society's leader.

Among other engineering societies in which Mr. Llewellyn is active are the American Society of Civil Engineers, the Brooklyn Engineers Club, the American Society for Testing Materials and the American Society for Steel Treating.

He built the first structural steel building to be erected in Mexico. This was in 1900 in Mexico City. His chief interest outside of business is music and he is a composer of considerable distinction. One of his hobbies is chess, which he plays at the Newark Athletic club, where he makes his home.

Purdue University to Offer Summer Course in Drafting and Welding

Professor J. D. Hoffman, Director, Department of Practical Mechanics, Purdue University, Lafayette, Indiana, makes the announcement that Purdue University is planning to administer summer shop and drawing room courses during the two months of the summer term.

Particular attention is called to course S 74, for welders and heat treaters. "This course," says Professor Hoffman, "is being put on at the suggestion of a number of the industries and the content of the course will be planned for the training of skilled workmen. Experienced, practical men are to administer the work."

The enrollment fee for the welding and all other summer courses is $27. Laboratory fee, supplies, etc., $10. Complete information concerning the course can be had by writing the Department of Practical Mechanics, Purdue University, Lafayette, Indiana.

Repairs for F. and N. Lawn Mower
From Robert Bollen, Miles, Iowa.

Please tell me who manufactures the F. and N. lawn mower, as I want to buy repairs for it.

Ans.—F. and N. Lawn Mower Company, Richmond, Indiana.

Random Notes and Sketches
By Sidney Arnold

"The essence of humor is sensibility; warm, tender fellow-feeling with all forms of existence."—Carlyle.

I had the pleasure of visiting at the place of business of Albert J. Wagner, 3762 North Clark Street, Chicago, on Tuesday of this week. Mr. and Mrs. Wagner had just returned from a 9,000-mile tour which occupied two months of their time and took them first to New York, where Mr. Wagner attended the National Slate Association conferences, following which they went to Miami, New Orleans, Houston, Galveston, San Antonio and Mexico City. The entire trip was made by rail.

During my visit at Mr. Wagner's office I also met his son, Albert, Jr., who is following his father's footsteps. He is learning the business from the ground up. Having studied under Adolph Keeler at the Washburn Trade School in Chicago for four years, where he secured a complete knowledge of the mechanical end, he is now gaining a thorough knowledge of the business end of the business under the very able tutelage of his father. It is also interesting to note that Mr. Wagner, Sr., was a frequent contributor to AMERICAN ARTISAN away back during the early history of this paper.

* * *

"Didn't you say this car would do seventy-five miles an hour without trouble?" asked Tommy Thompson, Mt. Vernon Furnace Company, recent purchaser, speaking to the agent.

"Yes," was the reply. "Didn't she?"

"She did seventy-five all right, but the trouble I got into cost me twenty dollars and costs."

* * *

"Can't you wait on me?" asked the impatient customer. "Two pounds of liver. I'm in a hurry."

"Sorry, madam," said the butcher, "but two or three are ahead of you. You surely don't want your liver out of order."

Old Slow Poke—"Mister Andersen, er—that is, I would like to, er—that is, I mean I have been going with your daughter for five years."

Walter Andersen, Walter Andersen Sheet Metal Works—"Well, whadda you want—a pension?"

* * *

Bill Busch—"What's become of the pet woodpecker you used to have?"

Al Berschbach—"I sold him to an antique furniture dealer, and he's got the poor thing working 18 hours a day making worm holes in tables."

* * *

An Inspirational Tale

Once upon a time there was a lazy fellow who wished to be rich. So a fairy appeared and gave him a lamp.

"Rub the lamp," explained the fairy, "and you can have what you want."

"Aw, go on," said the lazy guy, "It's just a scheme to get the brasswork polished."

* * *

Members of the warm air heating fraternity who have given the matter any thought are now advised of how Dave Farquhar happened to get into the register selling game. Young Dave sells T. & B. registers. It happened this way: A policeman was walking his beat in a residential district of Chicago one day. Dave, badly battered, rushed up to him.

"Say, officer," he panted, pointing to a redheaded iceman who had just climbed on his wagon, "I want that man arrested. Just look what he did to me!"

Stalking majestically into the street, the policeman waved the ice-wagon to a halt, and demanded, "Did you hit this man?"

"Oi did," was the shameless reply.

"What for?"

"Alienation av affections," replied the iceman. "He sold Bridget Nolan's missus wan av thim electric iceboxes."

HOT BLAST HEATING, VENTILATING AND FAN ENGINEERING

By T. W. Toor*

HEAT is not a substance, it is a form of energy and can only be measured as such. As long as there is vibration of the molecules composing a body of a given mass there will be heat. When this vibration increases the temperature of the body is raised, its sensible heat increases and the body feels warmer.

If the temperature is reduced so there is no vibration of molecules, the temperature would be the so-called absolute zero. In the ideal or perfect gas, of which air is the best example, the vibration of molecules ceases at 491.6 degrees below 32 degrees, the freezing point of water, or 459.6 degrees below our zero. In practice 460 degrees is considered absolute zero.

The transfer of heat may be by conduction, radiation or convection.

If one end of an iron bar is placed in a bed of hot coals heat will travel through the length of the bar. This is conduction. If the hand is held close to the bar the sensation of warmth will be felt. In other words, heat that passes through the air away from the bar is felt. This is radiation. Now, if a current of air is passed over the bar the air will take up heat from the bar and carry it to some distant point. This is convection.

In the hot water or steam system we have first conduction, heat from the combustion of fuel passing through the boiler. Radiation, heat radiating from the hot surfaces of the boiler. Convection, heat that is taken up by the water or steam and carried to the radiators. After reaching the radiators the heat again goes through the process of conduction, through the radiator and radiation from the radiator into the space to be heated.

In the warm air furnace we first have conduction through the castings. Radiation from the castings, the air passing through the casing picks up heat from the castings and convects it to the space to be heated.

The specific heat of a body is the amount of heat, required to raise a given weight of substance one degree as compared to the amount of heat required to raise the temperature of the same weight of water from 62 to 63 degrees Fahrenheit.

The amount of heat required to raise a pound of water from 62 to 63 degrees is called the British Thermal Unit (B.t.u.).

The specific heat of a pound of air is .2415 B.t.u. That is, it takes .2415 B.t.u. to raise a pound of air one degree. In engineering practice .24 B.t.u. is used and will be considered in all future calculations. In the same way .018 is the specific heat of a cubic foot of air. .02 is used in practice.

Whenever we add heat to a body without change of state we increase its temperature. The heat thus added is known as sensible heat.

Heat may be added to a body without change of temperature providing there is a change of state. Such as from a solid to a liquid or from a liquid to a gas. The heat thus added, which does not change the temperature but which changes the state, is known as latent heat.

For example, water at 32 degrees will absorb heat and its temperature will rise until it reaches 212 degrees (at sea level). Additional heat absorbed after the water has reached 212 degrees would be latent heat because it does not raise the temperature of the water but changes it into steam, a form of gas.

This latent heat is, however, not lost, for it reappears when the reverse process takes place. That is, it will be given up by the steam as it condenses back into water.

*This is the first of a series of articles by T. W. Torr, Rudy Furnace Company, on Hot Blast Heating and Fan Engineering.

Here's New Method of Treating Coal to Lengthen Its Life

Treatment Increases Heating Units in Coal and Produces Greater Efficiency

IT HAS been charged by forward looking economists that the warm air heating industry has not kept pace with other industries in the almost kaleidoscopic changes of the last few years. They point to the telephone, television, motor cars and flying machines. They call attention to recent economies in power production and to the fuel-less motor recently exploited in the daily press and the free energy machine in Kansas City.

These economists deplore the conservatism of the warm air heating industry and ask in the language of Buck Taylor's lady customer, "What are you going to do about it?"

It will probably be news to many persons to know that something has already been done about it, and that the industry is on the eve of revolutionary developments. One of its well known members has perfected a simple and low-priced method of treating coal so that its life is lengthened for a period of time, governed only by the length of the heating season in any particular locality.

We are privileged to give advance information of the method. A small amount of coal is put into the fuel bin where it is treated with a secret solution. It is claimed that the process is such that the coal is thoroughly mixed with the solution

and that women and children find the mixing a delightful pastime.

The heating unit requires no special preparation, except that grates should be carefully greased to facilitate the flow of ashes and should be fitted with a quick acting thermostatic control. The entire batch of treated coal, which consists usually of 10 pounds, is then put into the fire box and ignited from the top. The fuel burns slowly, but the treatment increases the heating units in the coal at a rate somewhat greater than a geometrical ratio. Furthermore the fire starting from the top allows the liquid used in the treatment to settle downward, which still further enriches the lower layer of fuel, making the process cumulative. The formula for the liquid has not been published, but the combustion formula has been made public. It is as follows:

One over the heat units in the fuel, plus the 10th power, minus the 9th power of the liquid. It will easily be seen that the plus and minus quantities are in reality positive and negative and are necessary on account of the positive and negative electricity used in the liquid.

The positive, being the larger, couples up with the positive charge in the air and, therefore, will flow on forever, giving increasing vigor to the fuel. The only obstacle so far observed is that the ash production follows the same natural law but in an inverse ratio. This maintains the equilibrium required by nature.

So far the ashes running through the greased grates have averaged 10 pounds of ash per pound of coal per day for the heating season. This will soon be regarded as an advantage.

Every twentieth year the newspapers discover and publish the old standard formula for burning ashes (Oxalic acid, salt and water). It is due this year and the demand for ashes should turn the ash problem into a profit. It is, therefore, seen that the carping critics of the industry have not justified themselves and brighter days are ahead of us.

Here's Warm Air Furnace That Served Owner Half a Century Without Repairs

Replaced by New Product of Same Make After Well Earned Retirement

FIFTY years of service without repairs of any kind is indeed a record of which to be proud! That is the record established by a Thatcher tubular furnace. Away back in 1876, twenty-two years before the Spanish-American war came to a close, the furnace was installed in the home of Thomas Ocheltree, West Hazelwood Avenue, Rahway, New Jersey. This furnace was removed in 1926 and replaced with another Thatcher tubular product, and investigation revealed only

Furnace That Served Owner Fifty Years

United States Fifty Years Behind in Construction Progress, Says Economist

New Normal in Building Level Is Established

"THE general level of building activity that has prevailed during the past three years probably represents the new standard or normal level for the industry in this country, and there is no reason to expect any material recession from this level in the future," Virgil Jordan, Chief Economist of the National Industrial Conference Board, told the Credit Association of the Building Trades of New York at their monthly luncheon at the Hotel McAlpin, recently.

"The immediate outlook for building," Mr. Jordan said, "depends chiefly upon general business and credit conditions in the next few months, and in these respects there is nothing to worry about, even though money may be temporarily tighter and business a little hesitant during the summer. It is far more reasonable to expect that after the stock market has had some of its speculative enthusiasm knocked out of it, easier money and rising prices will stimulate speculation in commodity markets and lead to a rapid and general expansion of business which will carry building along with it to still higher levels next year.

Says Discard Old Standards

"In the building industry, as in all other fields of business, it is high time that we throw overboard some of our traditional ideas of what is normal and proper and recognize that we live on a radically different plane of public demand and industrial accomplishment than before the war. There has never been a time in which there has been so much uncertainty and misgiving and so little fresh and sensible thought about business as now; and the reason why we are all at sea is we are trying to apply old formulas and old prejudices to conditions that are new and rapidly changing.

"Economists and statisticians like to fit all the ups and downs of business into regular cycles and to make its development conform over long periods to a smooth curve of growth. These formulas may be true enough as a historical record of our brief past, but there is no reason to suppose that we are chained to them for the future. Business is no mere machine following purely mechanical laws; it is determined fundamentally by changes in human psychology, but these the statistician has no means of taking into account. We must seek the origin and determinants of all major economic movements in the phychology of the public rather than in any mechanical laws of economic behavior.

"This is particularly true in its application to the building industry. During the past five years statisticians have been wrangling about the length of time before the wartime 'shortage' in building will be made up and the probable return to some 'normal' of building activity. Invariably these calculations have been upset by the facts, because the future growth of any fundamental type of consumption demand, such as building, cannot be measured by any purely statistical means.

Building Estimates Differ Greatly

"At the end of 1924, for instance, when the so-called building boom was just about to begin, we had the following expert estimates of the amount of the so-called business shortage: The United States Bureau of Labor Statistics asserted that at the end of 1924 construction not only had made up for the war shortage, but was actually about four-tenths ahead of current needs; the National Bank of Commerce estimated that the building shortage of over three billion dollars still remained at the end of 1924; at the beginning of 1924 Professor King maintained that most of the estimates of building shortage had been exaggerated and that there was no conclusive evidence that anything in the nature of an unsatisfied demand for building existed at that time; at the end of 1924, however, both Professor King and Col. Leonard P. Ayres estimated the building shortage at over seven billion dollars, while Dr. Clark estimated the accumulated shortage at over eleven billion.

"When you consider that in the three following years over twenty-

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two cracks in the heating units, one in the combustion chamber and one in the ash pit.

In writing about this performance record J. W. Moriarty, of the Thatcher Company sales department, made the following comment.

"In a recent issue of AMERICAN ARTISAN we were interested to note a challenge by the Hess-Snyder Company, of Massillon, Ohio, regarding one of their furnaces which has been in use since 1888.

"It is our pleasure to call to your attention and to Hess-Snyder Company, that in 1926 we removed a Thatcher tubular furnace from a home in Rahway, N. J., which had been in continuous service since 1876.

"This Thatcher tubular furnace served efficiently and economically its owner for a half century. That is why we had the pleasure of replacing the old furnace with a new Thatcher tubular furnace.

"We congratulate the Hess-Snyder Company for their unusual record and sincerely hope that they might some day have the quality and good fortune to duplicate the Thatcher Company's record in the future."

five billion dollars of building was done in the United States, it becomes clear that, as Dr. Clark then pointed out, the question of shortage was meaningless as a basis for estimating the future demand for building. We were not during those years, nor are we at the present time, engaged merely in making up a war-time shortage in building. The deficit in building during the war has very little if anything to do with the level of building activity in the past few years or at the present time. The level of building, like that of industrial and trade activity, is not determined by what happened in the past but by the way we feel and the things we want now and in the future. The demand for building depends not merely on the growth of population nor even upon the size of the existing population, but upon the current ideas, habits and customs of the public in respect to building accommodations and services and upon their general purchasing power or effective demand for such services.

Building Depends Upon Business

"It is far more accurate, therefore, to say that the level of building activity today depends upon general business conditions and national prosperity than to say, as we used to, that business activity and prosperity depend upon the amount of building that is done. Vast as the building industry is, our business activity has grown more rapidly in extent and variety so that business is relatively less affected by building construction than the building industry is by business, and the relation between the tail and the dog has become more normal. Building is affected now no longer by minimum needs but by the operation of powerful economic and social forces which grow out of the general business situation and its effect upon standards of living. Building activity consequently has become an index of the improved standard of living of the American public.

"Instead of talking about building shortages as a result of the war or about the building 'boom' during the past three years, we should rather consider that throughout the entire past the United States has been underbuilt from the point of view of current standards of living. The greater part of this country has been living and working and still is in a frontier or pioneer fashion.

"From a construction point of view most of the United States still looks like the devil and is fifty years behind the times, even as compared with most of the impoverished countries of Europe. We may therefore expect to be occupied with the enormous task of reconstructing and improving our national building equipment for years to come, and by the time we have caught up generally with even the current standards, these in turn will have shifted to a still higher level.

"Cautious and conservative people will ask where the money for all this is coming from, whether continued expansion in building will not invite speculative excesses and raise building costs to prohibitive levels. There may be some reason for feeling that building in some of the larger cities has run ahead of existing standards and effective demand, but I doubt whether this is true even in New York where large portions of the population still live under conditions that are inexcusable from either an economic or social point of view.

"Where Is Money Coming From?"

"So far as the question of disposable capital for building purposes goes, there is no ground for fearing any stringency in the long run. The constant flow of capital abroad and the outburst of speculation in the security markets all testify to the fact that even now the United States is saving a larger part of its national income than it should and is investing it in ways far more questionable than even the most speculative forms of building investment can be considered to be. The intensity of competition and improvements in industrial methods are putting limits upon domestic investments in the expansion of industrial plant and equipment. Changes in our financial system and banking conditions at home and abroad are releasing increasing credit resources which can be drawn upon for building purposes. If they are not used for such purposes they will be used for other types of speculation and investment far less sound from an economic or social point of view.

"Nor does the possibility of speculative excesses in building construction justify any exaggerated fears or restraints. Business men and most other people like to speculate. If they cannot do it in building and real estate, they will do it in securities or

"WOLF" CRY HEARD MANY TIMES BEFORE

I have been in industry now for 62 years. I have heard this cry about labor-saving machinery many times during those years. It comes up periodically. If you live long enough, you will hear it a lot more times. As long ago as 1866, the year when I started my work in the machine shop, there was calamity howling about labor-saving machines. Thousands of soldiers had come back from the Civil war, and had nothing to do. Timid people would look for something wrong, and they warned all of us mechanics that we must stop making labor-saving devices, or nobody could have work.

That was almost a generation ago, and somehow we have found employment for the tremendous increase in population in that 62 years; and all who have been employed in our industries have operated some kind of labor-saving machine or labor-saving device. Labor-saving machines have increased with the increase in workers. According to the calamity howlers of that time, our streets should now be filled with ragged, hungry men, and our country reduced to poverty. Has it happened? No. Just the opposite has happened.

CHARLES H. NORTON.

in commodities; and it is far better in the long run to speculate in such tangible social assets as homes and land than in perishable and imaginary assets like commodities and foreign securities. Likewise, though at any particular time prices and costs in the building field are very important to individuals, in the long run they do not matter very much. Prices merely express the relationship between things and services and in the long run they adjust themselves to the real demand and to the improvements in productive methods, which are going on at all times.

Constant Need for Building

"These considerations, however, do not in the least diminish the constant need for the building industry, like every other industry, to exercise to the full its intelligence, initiative and self control from year to year. The industry will have its ups and downs, its losses and its gains. Waste, extravagance and downright dishonesty or graft can be curbed only by constant watchfulness and effective organization within the industry itself. The building industry as a whole, it must be admitted, is still far behind other industries in respect to its internal organization, particularly of labor relationships, and in improvements in the efficiency of its methods.

"Much can be done by such organization and by careful planning to diminish the excessive fluctuations in building activities, and to coordinate it more closely with business conditions. The federal, state and local governments, which are today together the largest single buyer of building construction, can materially assist in this process, and are doing so to a much larger extent year by year. But we must not get the idea that stability is in itself a desirable thing for which everything else should be sacrificed. Prosperity in the building industry, like that in all other aspects of our business life, depends upon constant growth, and growth means constant change. In this country there is still far too great a tendency to think of the present situation in business as something fixed or normal, and to make every effort to keep things where they are; but this means a sacrifice of progress."

Du Pont Dealers' Meeting, St. Louis Very Successful

Ninety-two hardware dealers of St. Louis attended a successful du Pont dealer meeting held at the Missouri Athletic Club, May 9th. The meeting was arranged by Walter Tiemann of the F. Tiemann & Sons Stove and Hardware Company, wholesale distributors for du Pont paint products in St. Louis.

Prominent speakers on the merchandising program of the evening were H. R. La Towsky, merchandising manager of the E. I. du Pont de Nemours & Co., Chicago; F. X. Becherer, secretary of the Missouri Retail Hardware Association, and J. W. Greeves, district sales supervisor of the du Pont Company.

Mr. Becherer talked on "Cooperation" and "Making the Most of Your Association."

Mr. La Towsky talked on "Merchandising the Color Age," and Mr. Greeves talked on "Products." A short technical talk on "What Is Paint" was also given by Mr. R. J. Warrington of the Architectural division of the du Pont Company.

Although the meeting ended at 11:45 p. m., everyone stayed to the last. Since the meeting a number have asked when the next one will be held, inasmuch as they are so enthusiastic over this one.

Mr. Becherer said: "It is a splendid thing for wholesale organizations like the F. Tiemann Stove & Hardware Company and manufacturers like the E. I. du Pont de Nemours & Co. to hold helpful merchandising meetings for the dealer. In fact, the idea seems to be growing because it seems to be in line with the times.

"I was interested to learn that this meeting is an outgrowth of a very successful similar meeting staged some time ago by the Hibbard, Spencer, Bartlett Co. in Chicago."

"The average grocer makes only about 10% margin on sugar, while his cost of doing business is around 18%," said Mr. La Towsky. "It is foolish for him to push the sale of sugar, because every additional pound he sells, the more he loses.

"House paint usually carries a very low margin and when you take into account that this article is usually sold on credit and must be delivered, there is very little profit, if any, left in it.

"Why there should be so much emphasis on house paint, outside paint, is beyond me, because exterior surfaces constitute only about 20% of the paintable surfaces. Paints for the inside cater to a market which contains about 80% of the paintable surfaces.

"The average dealer today in paints who does not look upon his paint department as a profit has arrived at this conclusion because he has found himself doing a large volume of outside paint business with very little profit."

Leon D. Nish Resigns as Illinois Retail Hardware Secretary

The president and Board of Governors of the Illinois Retail Hardware Association announce that after more than a quarter of a century of service to the association as secretary-treasurer, Leon D. Nish has tendered his resignation, effective June 1, 1928.

They also wish to announce the selection of Paul M. Mulliken as his successor on the recommendation of Mr. Nish.

That the counsel and advice of the former secretary may be available, Leon D. Nish was made a member of the Board of Governors and the chairman of the Executive Board.

More nearly to describe the activities of the office, the title secretary-treasurer has been changed to managing director, and Mr. Mulliken will assume the duties of the secretary-treasurer under the new title.

The Board of Governors also announce the designation of R. Y. Wallace as director of exhibits.

"Furnace Salesman" Suggests Question and Answer Method of Training Dealers

Gives List of Questions for Better Business Committee to Answer

IN RESPONSE to the invitation contained in the AMERICAN ARTISAN issue of May 5th, I suggest that a list of possible questions, similar to the following, be made up, and a series of articles giving the answers recommended by the Better Business Committee of the National Warm Air Heating Association be published in AMERICAN ARTISAN. This list to be added to or changed as the committee sees fit.

There are a great many dealers who, with a little more "schooling," could present the story and advantages of warm air heating in better form if they were prepared to answer questions and encouraged a prospective buyer to ask questions.

Of course the answers to most of these questions have been furnished the dealers through bulletins and other forms, following the research work, but it occurs to me that the question and answer method would further help the dealers.

I once saw a booklet published by a manufacturer of another product which contained questions that a customer might ask, followed by what the manufacturer would say if they were dealing personally with the prospect, and this booklet was a great help to dealers and their salesmen.

Questions

Which is the best method of heating? Which is the healthiest? What makes the warm air heating system a healthy form of heat? How does the cost of operating the different systems compare? How much coal will be required per year to heat my house? What's the idea of measuring up the house? What is the standard code? Who is responsible for the standard code?

Of what benefit is the water pan? What is the average life of a warm air furnace? Isn't it a fact that farm air furnaces are dusty and dirty? What causes that dirty streak on the wall above and around registers?

When a warm air furnace is used isn't it true that most of the heat is in the cellar? When you install cold air ducts don't they take up too much room in the cellar? By using this system isn't it true that we breathe the same air over and over again?

Why not take the cold air from the outside? Why wouldn't it be a good idea to take part of the cold air from the outside and the balance from the inside?

Why do you say the ideal system is to take the cold air from each room and then tell me your figure includes two cold air ducts, both from the first floor, none from the second floor?

Isn't there a danger of a draft across the floor when the cold air is taken from the inside?

Won't this inside air shorten the life of the furnace?

How do you account for the fact that some furnaces with outside cold air ducts attached have been in use for so many years?

You don't get the same grade of material in a furnace these days that you used to get, now do you?

Won't these cold air faces placed in the floor present an unsightly appearance? I don't like the idea of my floors being cut, isn't there some other way? Why do they have to be that large?

Why do you have to put the register there, that is where I wanted my piano?

Will it hurt if we put our "davenport" over the cold air register?

I know we had floor registers in our old house and they were regular dirt catchers, don't you think it will be the same with those cold air faces in the floor?

Why do you say the furnace must be located there?

Why do the cold air ducts have to drop down that far below the joists, we are sure to bump our heads?

You say your furnace is absolutely smoke and gastight, what will you do about it if it smokes?

You guarantee to heat my house and what will you do about it if it doesn't?

Is there any guarantee in connection with this furnace as to how long it will last?

What type of furnace do you really think the best, cast-iron or steel? Which one will last the longest?

Does a heavier furnace mean that it will last longer than one that is lighter in weight?

Now you say the owner must assume the responsibility of the proper chimney draft, you see the chimney and ought to know if it is all right, why not you be responsible if your furnace does not work on this chimney? Jones says his furnace would.

What are the proper dimensions for the chimney?

Why do you think this double pipe, as you call it, is the best?

Or, which is the best, the double or single wall pipe?

Well, how much is it going to cost me? (State the best way for the dealer to present his figure.)

Well, I certainly did not expect to pay that much for a furnace, how does it happen to run so high?

Why does your furnace cost so much more than Jones'? He said a 24 inch would heat this house and you have figured a 26 inch, why is that?

I don't want to pay extra for a 26 inch furnace if a 24 inch will do the job. Won't the 26 inch burn more coal?

Jones said he would put the furnace in and take the cold air from

the cellar if we wanted to save money, do you think the cold air ducts are worth the extra money?

If we give you the order when can you make the installation?

I have written the above questions because I believe the ability to answer them intelligently is helpful to a dealer in closing a sale.

We have tried to confine our questions along general lines, but, of course, there would be points of superiority the different furnace manufacturers would like to call to the prospect's attention.

How Much Is a Salesman Worth?

Fitting Remarks has always maintained that the furnace dealer should get out of the "tinner" class and be a better salesman. We believe this position is sound. A mechanic is worth so much per hour or per day, but a salesman's earning power is unlimited. The astonishing profits that can be made through salesmanship were strikingly illustrated by an article that we recently read in a clothiers' magazine.

The gist of the story seemed to be about like this: A dry goods merchant bought some frocks which he thought women would buy on merit. He put one in his window marked $9.98. This price represented 49 cents' worth of raw material, $1.36 worth of labor, $2.08 worth of transportation and $6.05 worth of salesmanship. It was a nice little dress, but nobody thought it could be worth much at so low a price. Nobody bought it.

Another merchant, who had some real salesmen on his staff, bought a dress exactly like it. But this little frock was displayed in a spacious room, the floor of which was covered with a high-priced Persian rug. Soft rose lights were turned on and about two dozen palms placed at the proper angles. A raven-haired princess with a French accent came to preside over the dresses in this sumptuous room and tell the patrons all about the little frock—she knew how. The tag on the little frock read $85.00. Four sweet ladies sighed and wished they could afford it and the fifth bought it—49 cents' worth of raw material, $1.36 worth of labor, $2.08 worth of transportation, and $81.07 worth of salesmanship! This merchant sold many dresses, and prospered.

Selling furnaces is different, you say? Not so much. You can cut your prices and put your furnaces in an unattractive window without selling enough to pay rent; or you can show attractive samples in an attractive show room and tell people what will make them want your furnaces at your price. You can do the latter if you stop considering yourself a tinner and pay as much attention to selling as you do to the mechanical end of your business. Then you'll find out how much a salesman is worth!—*Fitting Remarks.*

Milcor Has New Manual of Valuable Information

The latest edition of the Milcor Manual, No. 20-E, which has just come off the press contains 96 pages of useful and up-to-date information which is extremely valuable to architects, contractors and builders of all kinds.

The four different types of Milcor metal lath are shown and discussed, with relation to the definite uses; these are taken up in detail.

A ten-page section devoted to

Facsimile of Book

solid partitions on metal lath is a valuable new addition. It contains entirely new information on the erection of solid partitions and the advantages of this type of construction. Detailed drawings help to clarify the points brought up. The solid partition form of construction is attracting much attention in the building trade. Here is an opportunity for architects and builders who are interested in this type of construction to get some new ideas and new, authentic information.

New Milcor products in the fireproof material line are described in detail. They include a new clip for fastening rib lath to I-beams, a concrete joist insert for fastening attached or suspended metal lathed ceilings to concrete joists, a new "Expansion" corner bead with one narrow wing, Milcor corner lath, a coping cutter for bull nose "expansion" corner bead, and a complete line of metal window stools, chair rails, cove bases, chalk trough and blackboard trim.

The Milcor ¾-inch rib lath Bulletin No. 20-D has been incorporated in the new manual. This section describes the tests to destruction to which Milcor ¾-inch stay-rib lath was subjected, and the conclusions reached as a result of these tests. Much practical data on Milcor ¾-inch rib lath as concrete reinforcing is included.

The Milwaukee Corrugating Company, Milwaukee, Wisconsin, will gladly mail a copy to anyone on request.

L. G. Colburn Goes With Western Steel Products Company, Duluth

L. G. Colburn has been appointed manager of the furnace department of the Western Steel Products Company, Duluth, Minnesota. Mr. Colburn has had wide experience in the warm air heating business, and a host of friends who all join in wishing him the greatest of success in his new connection.

Fred C. Rueth Opens New Furnace Business at Rock Island

Fred C. Rueth has opened a new warm air heating establishment at 420 23rd Street, Rock Island, Illinois, and will handle the Royal furnace manufactured by the Hart & Crouse Company.

Steel Volume Tapering Off Gradually—Unfilled Orders Decline 10.7 Per Cent

Pig Iron Prices Easier—Lead Buying Light

MOMENTUM acquired during the first quarter still is carrying iron and steel demand along on a fairly high plane, but the volume of new business is easing off gradually. While shipments continue heavy, a slight recession is noted from week to week in mill operations. Orders are not as large as in recent weeks, and though there is no definite change in steel prices, the easy tendency persists.

Valley foundry iron has reached a new low level on the present movement, with small-lot sales at $17, base, or 25 cents under the recent minimum. Chicago furnaces have reduced foundry and malleable 50 cents to $18. A large tonnage of malleable for delivery over the second half to a Muncie, Ind., melter, is reported to have been placed with a Cleveland maker at $16, base, furnace, or 50 cents under the recent minimum.

Production of beehive furnace coke has been reduced to contract requirements, steadying the market, while standard foundry grades are being offered at $3.50, or ten cents less than a week ago.

Further evidence of high steel production last month, as well as the more conservative attitude of buyers, is noted in the sharp decline of 463,073 tons, or 10.7 per cent, in unfilled orders of the United States Steel Corp., during April. The total on books at the close of the month was 3,872,133 tons, compared with 4,335,206 tons on March 31.

A stronger tendency is noted in the market for sheet bars, one or two of the valley producers announcing an advance of $1 to $34 for third quarter, although buyers are not displaying much interest and other producers quote $33.

Pig Iron

Less activity is noted at Pittsburgh in the pig iron market. Shipments, however, are going forward against contracts, and only in a few instances are shipping instructions withheld.

Several makers report booking new requirements for regular customers not under contract. None has started buying for third quarter or last half.

One merchant producer has sold small lots of foundry iron at $17, base, as against the recent minimum of $17.25, which is adhered to by other merchant and steelworks furnaces. Malleable is unchanged at $17.25. Basic is held at $16.50, valley, with no opportunities to quote. Bessemer is selling in single carloads at $17.50, valley.

Several important sales of spot pig iron have been made at Chicago and a 1000-ton spot inquiry is out for foundry iron from a Milwaukee district melter, and 500 tons in the Chicago territory.

Spot fill-in tonnages continue to come out steadily, but buying for future delivery has dropped off. Some third quarter inquiry is appearing.

Stocks in furnace yards are large but are well balanced as to analysis. At least one sale of silvery iron is reported at $1.25 under schedule.

Foundry and malleable iron prices were marked down 50 cents to $18, base, Chicago furnace, by one interest today and it is understood others are following, to equalize competitive conditions.

At Birmingham no change is noted in the pig iron market. To verify sales at $16, base, Birmingham, one of the larger makers showed contracts today for 1500 tons at that base. The sales are in small lots.

Copper

Electrolytic sold Monday on the basis of 14.37½ cents, Connecticut. It had been on or near 14.25 cents since early in December. Large buying was done just a few days before the rise for domestic shipment, a little for May, much for June and some for July.

Lead

Buying has been light but there is evidence that demand is about to become more active. Prices have held unusually steady.

Tin

Buying by users has been light and this fact has bothered the market, though consumption continues large. Spot metal is tightly held and the premium increased.

The market has been fluctuating without any decided tendency. Supplies continue large, with talk about hidden metal.

Zinc

Prime western has sold above 6.00 cents, East St. Louis. Business has not been large but many conditions have been favorable to the market. Good May business was done about a week ago.

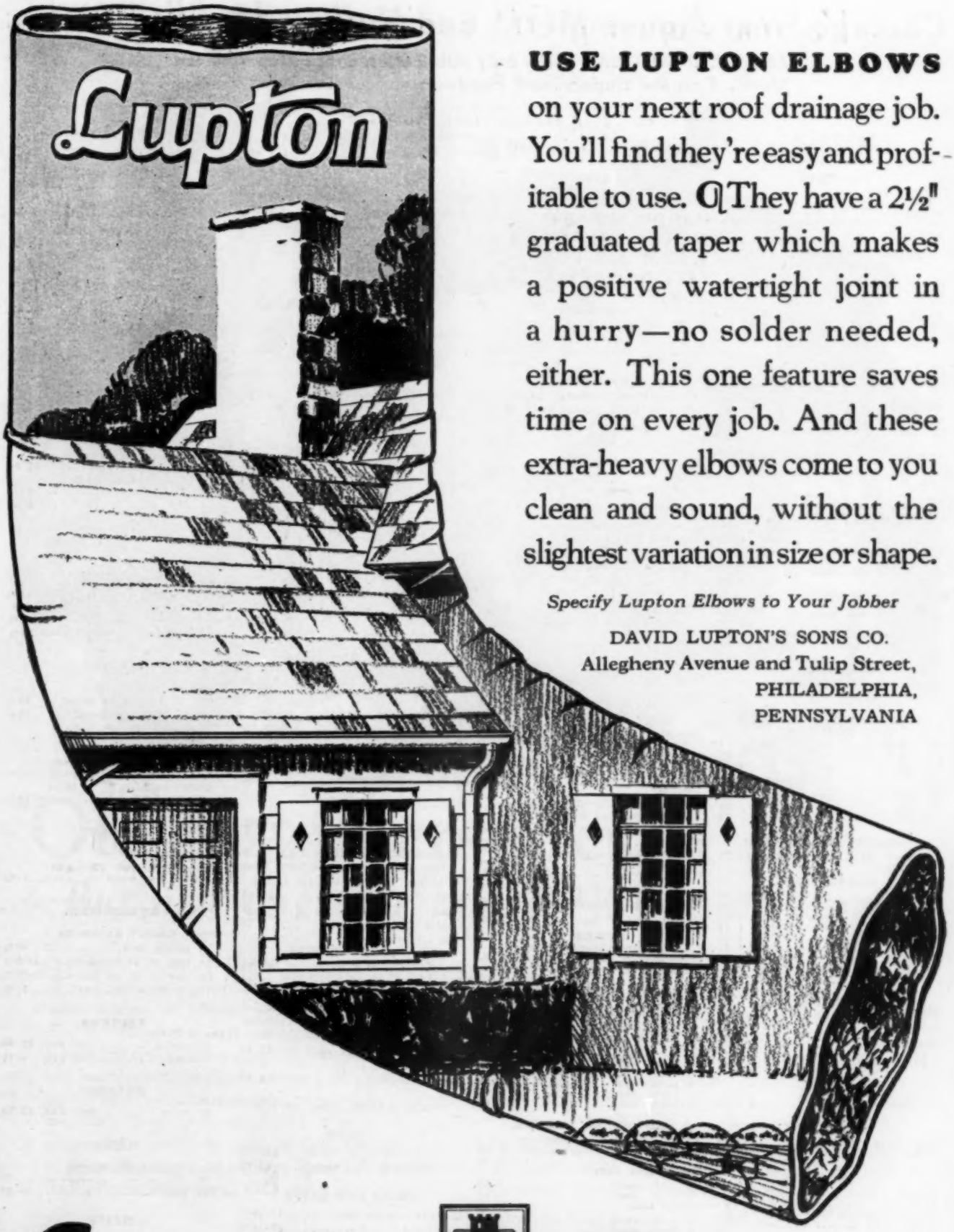
Stocks at the end of April were 44,759 tons, after shipment of 46,517 to domestic users and 3,746 export.

Solder

Chicago warehouse prices on solder are as follows: Warranted 50-50, $32.25; Commercial 45-55, $29.25; plumbers', $26.25; all per 100 pounds.

Old Metals

Wholesale quotations in the Chicago district, which should be considered as nominal, are as follows: Old steel axles, $16.00 to $16.50; old iron axles, $21.50 to $22.00; steel springs, $16.25 to $16.75; No. 1 wrought iron, $11.50 to $12.00; No. 1 cast, $12.75 to $13.25, all per net tons. Prices on non-ferrous metals are quoted as follows per pound: Light copper, 9 cents; zinc, 3½ cents; cast aluminum, 13¾ cents.



USE LUPTON ELBOWS

on your next roof drainage job. You'll find they're easy and profitable to use. They have a 2½" graduated taper which makes a positive watertight joint in a hurry—no solder needed, either. This one feature saves time on every job. And these extra-heavy elbows come to you clean and sound, without the slightest variation in size or shape.

Specify Lupton Elbows to Your Jobber

DAVID LUPTON'S SONS CO.
Allegheny Avenue and Tulip Street,
PHILADELPHIA,
PENNSYLVANIA

Lupton QUALITY Elbows

Say you saw it in AMERICAN ARTISAN—Thank you!

Chicago Warehouse Metal and Furnace Supply Prices

AMERICAN ARTISAN is the only publication containing Western Metal, Furnace Supply and Hardware prices corrected weekly

METALS

PIG IRON

Chicago Fdy., No. 2	$18.00
Southern Fdy. No. 2	22 91
Lake Superior Charcoal	27 04
Malleable	18.00

FIRST QUALITY BRIGHT TIN PLATES

IC	20x28 112 sheets	$25 10
IX	20x28	29 60
IXX	20x28 56 sheets	16 20
IXXX	20x28	17 55
IXXXX	20x28	18 95

TERNE PLATES

		Per Box
IC	20x28, 40-lb. 112 sheets	$25 00
IX	20x28, 40-lb. 112 sheets	27 75
IC	20x28, 25-lb. 112 sheets	21 15
IX	20x28, 25-lb. 112 sheets	22 80
IC	20x28, 20-lb. 112 sheets	19 55
IV	20x28, 20-lb. 112 sheets	22 05
IC	20x28, 15-lb. 112 sheets	18 05

"ARMCO" INGOT IRON PLATES

No. 8 ga. up to and including ¼ in.—100 lbs. $4 55

COKE PLATES

Cokes, 80 lbs., base, 20x28	$13 60
Cokes, 90 lbs., base, 20x28	13 80
Cokes, 100 lbs., base, 20x28	14 00
Cokes, 107 lbs., base, IC 20x28	14 20
Cokes, 135 lbs., base, IX 20x28	16 40
Cokes, 155 lbs., base, 56 sheets	9 20
Cokes, 175 lbs., base, 56 sheets	10 05
Cokes, 195 lbs., base, 56 sheets	10 90

BLUE ANNEALED SHEETS

Base 10 ga. per 100 lbs.	$3 50
"Armco" 10 ga. per 100 lbs.	4 00

ONE PASS COLD ROLLED BLACK

No. 18-20 per 100 lbs.	$3 75
No. 22 per 100 lbs.	3 90
No. 24 per 100 lbs.	3 95
No. 26 per 100 lbs.	4 05
No. 27 per 100 lbs.	4 10
No. 28 per 100 lbs.	4 20
No. 29 per 100 lbs.	4 35
No. 30 per 100 lbs.	4 45

"ARMCO" GALVANIZED

"Armco" 24 ....per 100 lbs. $6 15

GALVANIZED

No. 16 per 100 lbs.	$4 30
No. 18 per 100 lbs.	4 45
No. 20 per 100 lbs.	4 60
No. 22 per 100 lbs.	4 65
No. 24 per 100 lbs.	4 80
No. 26 per 100 lbs.	5 05
No. 27 per 100 lbs.	5 15
No. 28 per 100 lbs.	5 30
No. 30 per 100 lbs.	5 70

BAR SOLDER

Warranted

50-50 .....per 100 lbs. $32 25

Commercial

45-55 .....per 100 lbs.	29 25
Plumbers ...per 100 lbs.	26 25

ZINC

In Slabs .....$ 8 50

SHEET ZINC

Cash Lots (600 lbs.)	$12 00
Sheet Lots	13 00

BRASS

Sheets, Chicago base	18c
Mill base	18½c
Tubing, brazed base	27c
Wire, base	18½c
Rods, base	16c

COPPER

Sheets, Chicago base	24¼c
Mill base	23¼c
Tubing, seamless base	26c
Wire, No. 9, B & S Ga.	19¼c
Wire, No. 10, B & S Ga.	19¼c
Wire, No. 11, B & S Ga.	20c
Wire, No. 3, B & S Ga. and heavier	18¾c

LEAD

American Pig	$7 00
Bar	8 00

TIN

Pig Tin per 100 lbs.	$59 00
Bar Tin per 100 lbs.	60 00

HARDWARE, SHEET METAL SUPPLIES, WARM AIR FURNACE FITTINGS AND ACCESSORIES.

ASBESTOS

Paper up to 1/16	6c per lb.
Roll board	6¼c per lb.
Mill board 3/32 to ⅛	6c per lb.
Corrugated Paper (250 sq. ft. to roll)	$6 00 per roll

BRUSHES

Furnace Pipe Cleaning

Bristle, with handle, each $0 75

Flue Cleaning

Steel only, each 1 25

BURRS

Copper Burrs only 40-2½%

CEMENT, FURNACE

American Seal, .5-lb. cans, net	$ 45
American Seal, 10-lb. cans, net	85
American Seal, 25-lb. cans, net	2 25
Pecora .....per 100 lbs.	7 50

CHIMNEY TOPS

Adams' Revolving

	Wt. Doz.	Price Doz.
4 in.	21 lbs.	$11 00
6 in.	24 lbs.	11 50
7 in.	30 lbs.	13 50
8 in.	32 lbs.	15 00
9 in.	51 lbs.	16 50
10 in.	56 lbs.	18 00
12 in.	66 lbs.	22 00
14 in.	110 lbs.	36 00

CLINKER TONGS

Each	$0 75
Per doz.	8 40

CLIPS

Damper

No-Rivet Steel, with tail pieces, per gross	$9 50
Rivet Steel, with tail pieces, per gross	7 50
Tail pieces, per gross	2 40

COPPERS—Soldering

Pointed Roofing

3	lb. and heavier ..... per lb.	40c
2½	lb. ..... per lb.	45c
2	lb. ..... per lb.	48c
1½	lb. ..... per lb.	55c
1	lb. ..... per lb.	60c

CORNICE BRAKES

Chicago Steel Bending

Nos. 1 to 6B.....Net

CUT-OFFS

Gal., plain, round or cor. rd.

26 gauge	30%
28 gauge	35%

DAMPERS

"Yankee" Hot Air

7 inch, each 20c, doz.	$1 60
8 inch, each 25c, doz.	2 20
9 inch, each 30c, doz.	2 60
10 inch, each 32c, doz.	2 80

Smoke Pipe

7 inch, doz.	$1 60
8 inch, doz.	2 20
9 inch, doz.	3 00
10 inch, doz.	3 75
12 inch, doz.	4 50

ADAMS No. 1 CHECK

Check and Collar Complete

8 inch, each	2 00
9 inch, each	2 25

End Check Only

8 inch, each	1 60
9 inch, each	1 85

Collar Only

8 inch, each	50
9 inch, each	65

No. 2 CHECK

8 inch, each	1 00
9 inch, each	1 00

10% Disc. on Adams No. 1 and No. 2 Check

Diamond Smoke Pipe

7 inch, doz.	$ 2 00
8 inch, doz.	3 20
9 inch, doz.	4 80
10 inch, doz.	6 00

Adams' Sheet Metal

7 inch, doz.	$ 1 60
8 inch, doz.	2 20
9 inch, doz.	2 60
10 inch, doz.	2 80
12 inch, doz.	3 50
14 inch, doz.	5 00

EAVES TROUGH

Galv. Crimpedge, crated 75 & 5%	
Zinc, "Barnes"	60%

ELBOWS

Conductor Pipe

Galv. plain or corrugated, round flat Crimp.

28 Gauge	60%
26 Gauge	45%
24 Gauge	15%

Galv. & Terne Steel

Plain Rd. and Rd. Corr.:

28 Ga.	60%
26 Ga.	45%
24 Ga.	15%

Square Corrugated

No. 28 Gauge	50%
26 Gauge	35%

Portico Elbows

Standard Gauge Conductor Pipe, plain or corrugated.

Not nested	70 & 5%
Nested Solid	70 & 5%

Sq. Corr., A. & B. & Octagon

28 Ga.	50%
26 Ga.	35%

Portico

1", 1¼", 1½" 45%

Copper

16 oz., all designs..... 50%

Zinc—

All styles 60%

ELBOWS—Stove Pipe

1-piece Corrugated. Uniform Blue "Milcor" No. 28 Gauge.

	Doz.
5-inch	$1 05
6-inch	1 20
7-inch	1 75

Special Corrugated

6-inch	$1 00
7-inch	1 60

Adjustable—Uniform Blue

"Milcor" No. 28 Gauge. Uniform Blue.

5-inch	$1 65
6-inch	1 75
7-inch	2 10

WOOD FACES—50% off list.

FENCE

726-6-12½% (100 rods)	$28 68
1048-6-14½% (100 rods)	43 62

FILES AND RASPS

Heller's (American)	50-10%
American	60-10%
Arcade	50%
Black Diamond	50%
Eagle	50%
Great Western	50%
Kearney & Foot	50%
McClellan	50%
Nicholson	50%
Simonds	60%

FIRE POTS

Geo. W. Diener Mfg. Co.	Ea.
No. 02 Gasoline Torch, 1 qt.	$ 5 13
No. 0250, Kerosene, or Gasoline Torch, 1 qt.	6 50
No. 10 Tinner's Furn. Square tank, 1 gal.	11 36
No. 15 Tinner's Furn. Round tank, 1 gal.	10 70
No. 21 Gas Soldering Furnace	2 60
No. 110 Automatic Gas Soldering Furnace	10 50

Quick Meal Stove Co.

Vesuvius, F. O. B. St. Louis 30%
(Extra Disct. for large quantities.)

GALVANIZED WARE

Pails (Galv. after made), 10-qt.	$2 00
Tubs (Galv. after made).	
No. 1	5 75
No. 2	6 50

GLASS

Single Strength, A, 52-in. brackets	87%
Single Strength, A, 34 to 40-in. bracket	86%
Single Strength, A, all other brackets	80-5%
Double Strength, A, all sizes	80%

HANGERS

Conductor Pipe

Milcor Perfection Wire	25%
Milcor Triplex Wire	10%

Eaves Trough

Milcor Steel (galv. after forming) List	plus 12½%
Milcor Sellock E. T. Wire, List	plus 50%

HOOKS

Conductor

"Direct Drive" Wrought Iron for wood or brick..15%

HUMIDIFIER

"Front-Rank," Automatic

In single lots	50%
In lots of 10 or more	50-5%
In lots of 25 or more	50-10%
Vapor pans, etc., each	50%

LIFTERS

Stove Cover

Coppered .....per gro.	$6 00
Alaska .....per gro.	4 75

MALLETS

Tinners

Hickory .....per doz. $2 25

MITRES

Galvanized steel mitres.

28 Ga.	70
26 Ga.	60-20

NAILS

Cut Steel	$4 35
Cut Iron	4 35

Wire

Common	$ 3 10
Cement Coated	$ 3 10

(Continued on Page 124)

"Old customers? Yes!

But new ones are the surest sign of growth"

"IF you'll pardon me, I'd like to make a suggestion. I've seen you a settin' there porin' over that ledger many a time, an' I know just what you're a doin'. You're sorta gloatin' over our regular customers. An' you're right; far as that goes! But we can't increase our business with just old customers. We got to keep gettin' new ones. The customers we *get* added to what we *had*—that's progress, that's growth! So the suggestion I want to make is that we take hold of this new recognition of Sheet Steel and build up a flock of new customers. Let's leave the ledger lay—the old ones'll stick, long's we continue to treat 'em right—and let's get goin' on a drive to bring in new customers—folks we see every day but who've never given us a job—on the strength of the growin' popularity of Sheet Steel. New roofs, new gutters, new furnaces, industrial work—steel's the thing to create business *with*!"

* * *

For suggestions on creating new steel customers, write the SHEET STEEL TRADE EXTENSION COMMITTEE, TERMINAL TOWER BUILDING, CLEVELAND, OHIO.

SHEET STEEL

for Strength Safety Beauty *and* Economy

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NETTING, POULTRY

Galvanized before weaving 60%
Galvanized after weaving.50-10%

PASTE

Asbestos Dry Paste:

300-lb. Barrel	$16 00
100-lb. barrel	5 75
25-lb. pail	2 50
10-lb. bag	1 10
5-lb. bag	60
2½-lb. cartons	35

POKERS, FURNACE

Each $0 75

POKERS, STOVE

Nickel Plated, coil handles, per doz.	1 10
W'r't Steel, str't or bent, per doz.	$0 75

PIPE

Conductor
Cor. Rd., Plain Rd., or Sq.

Galvanized
Crated and nested (all gauges) 75-2½%
Crated and not nested (all gauges) 70-15%

Furnace Pipe
Double Wall Pipe and Fittings 50%
Single Wall Pipe, Round Galvanized Pipe 50%
Galvanized and Tin Fittings 50%

Lead
Per 100 lbs. $12 50

Stove Pipe
"Milcor" "Titelock" Uniform Blue Stove

28 gauge, 5 inch U. C. nested	10 50
28 gauge, 6 inch U. C. nested	11 00
28 gauge, 7 inch U. C. nested	13 00
30 gauge, 5 inch U. C. nested	9 00
30 gauge, 6 inch U. C. nested	10 00
30 gauge, 7 inch U. C. nested	12 00

T-Joint Made up
6-inch, 28 ga....per doz. $ 4 00

All Zinc
No. 11, all styles.....60%

PULLEYS

Furnace Tackle....per doz.	$0 35
.....per gro.	3 50
Furnace Screw (enameled) .....per doz.	75

PUTTY

Commercial Putty, 100-lb. Kits $3 50

QUADRANTS

Malleable Iron Damper.....10%

REDUCERS—Oval Stove Pipe

	Per Doz.
7—6, 28-gauge, 1 doz. in carton $3 00	

REGISTERS AND BORDERS

Baseboard, Floor and Wall.

Cast Iron 20%
Steel and Semi-Steel.....40%
Baseboard, 1 piece.....40-20%
Baseboard, 2 piece.....40%
Wall 40%
Adjustable Ceiling Ventilators 40%

Register Faces—Cast and Steel

Japanned, Bronzed and Plated, 4x6 to 14x14.....40%
Large Register Faces—Cast, 14x14 to 38x42.....60%
Large Register Faces—Steel, 14x14 to 38x42.....65%

Ventilating Register

Per gross	$ 65
Small, per pair	20
Large, per pair	50

RIDGE ROLL

Galv., Plain Ridge Roll, b'did 75-10-5%
Galv., Plain Ridge Roll crated 75-10%
Globe Finials for Ridge Roll..50%

SCREWS

Sheet Metal

7, ⅛x⅛, per gross	$0 52
No. 10, ⅜x3/16, per gross	68
No. 14, ⅜x¼, per gross	82

SHEARS, TINNERS' & MACHINISTS'

Viking $22 00

Lennox Throatless
No. 18 .....35%
Shear blades 10%
(f. o. b. Marshalltown, Iowa)

SHIELDS, REGISTER

No. 1 "Gem" floor.....$12 00 doz.
No. 2 "Gem" wall..... 6 00 doz.

SHOES

Galv. 28 Gauge, Plain or corrugated round-flat crimp...60%
26 gauge round flat crimp....45%
24 gauge round flat crimp....15%

SNIPS, TINNERS

Clover Leaf .....40 & 10%
National .....40 & 10%
Star 50%
Milcor .....Net

SQUARES

Steel and Iron .....Net
(Add for bluing $3 per doz. net)
Mitre .....Net
Try .....Net
Try and Bevel.....Net
Try and Mitre.....Net
Fox's .....per doz. $6 00
Winterbottom's 10%

STOPPERS, FLUE

Common .....per doz.	$1 10
Gem, No. 1.....per doz.	1 10
Gem, flat, No. 2....per doz.	1 00

VENTILATORS

Standard .....30 to 40%

WIRE

Plain annealed wire, No. 9 per 100 lbs.	$3 05
Galvanized barb wire, per 100 lbs.	3 90
Wire Cloth—black painted, 12-mesh, per 100 sq. ft....	1 85
Cattle Wire—galvanized catch weight spool, per 100 lbs..	3 80
Galvanized Hog Wire, 80 rod spool, per spool	3 15
Galvanized Plain Wire, No. 9, per 100 lbs.	3 80
Stove Pipe, per stone.....	1 10

WRINGERS

No. 798, Guarantee ...each	$3 10
No. 776, Bicycle .....each	4 70
No. 676, Domestic ....each	4 35
No. 116, Brighton ....each	3 70
No. 786, Guarantee ...each	3 10
No. 740, Bicycle .....each	4 70
No. 21, Pioneer. .....each	3 40
No. 3, Superb .....each	3 85

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Contributing SHEET STEEL TRADE EXTENSION COMMITTEE Member

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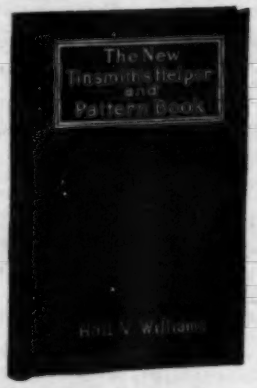
247 Figures
165 Tables



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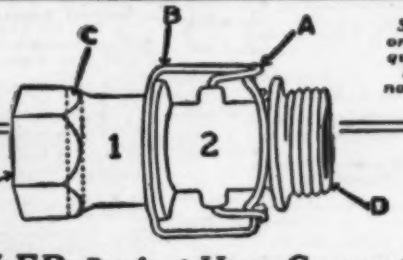
The simplest hose coupling made



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Ryerson & Son, Inc., Jos. T., Chicago, Ill.

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American Wood Register Co., Plymouth, Ind.
Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City
United States Register Co., Battle Creek, Mich.

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Milwaukee Corrugating Co., Mil., Ch'go, La Crosse, Kan. City

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Chicago Metal Mfg. Co., Chicago, Ill.

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Linde Air Products Co., New York, N. Y.

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Harrington & King Perforating Co., Chicago, Ill.
Hart & Cooley Co., New Britain, Conn.
Independent Reg. Co., Cleveland, Ohio
Tuttle & Bailey Mfg. Co., Chicago, Ill.
United States Register Co., Battle Creek, Mich.

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Handles—Soldering Iron.
Hyro Mfg. Co., New York, N. Y.

Hangers—Eaves Trough.
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Lupton's Sons Co., David, Philadelphia, Pa.
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Mueller Furnace Co., L. J., Milwaukee, Wis.
Waterman-Waterbury Co., Minneapolis, Minn.

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Machinery—Culvert.
Bertsch & Co., Cambridge City, Ind

Machines—Tinsmith's.
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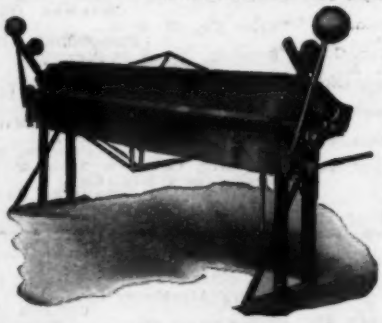

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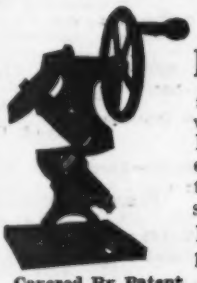

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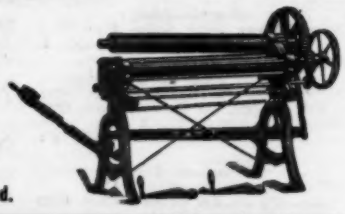

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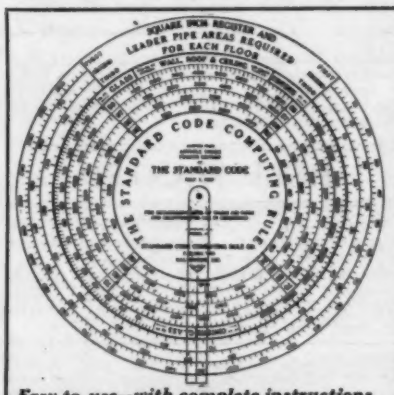

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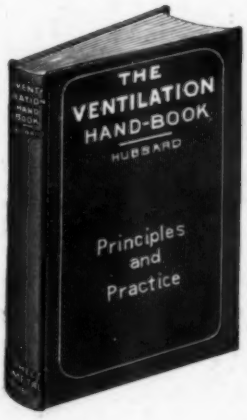

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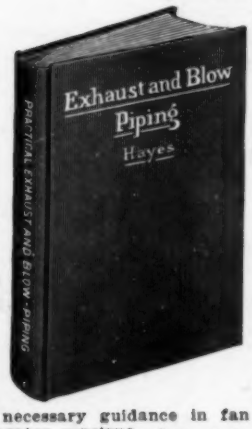

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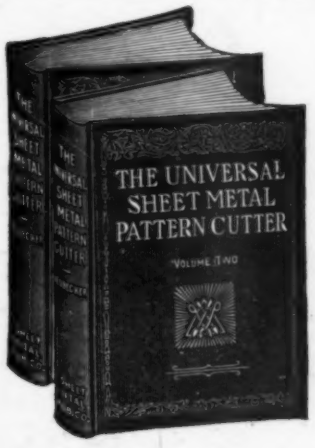

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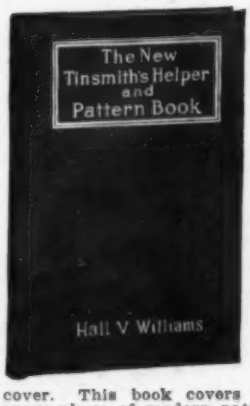

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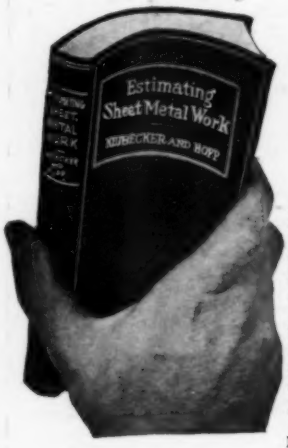

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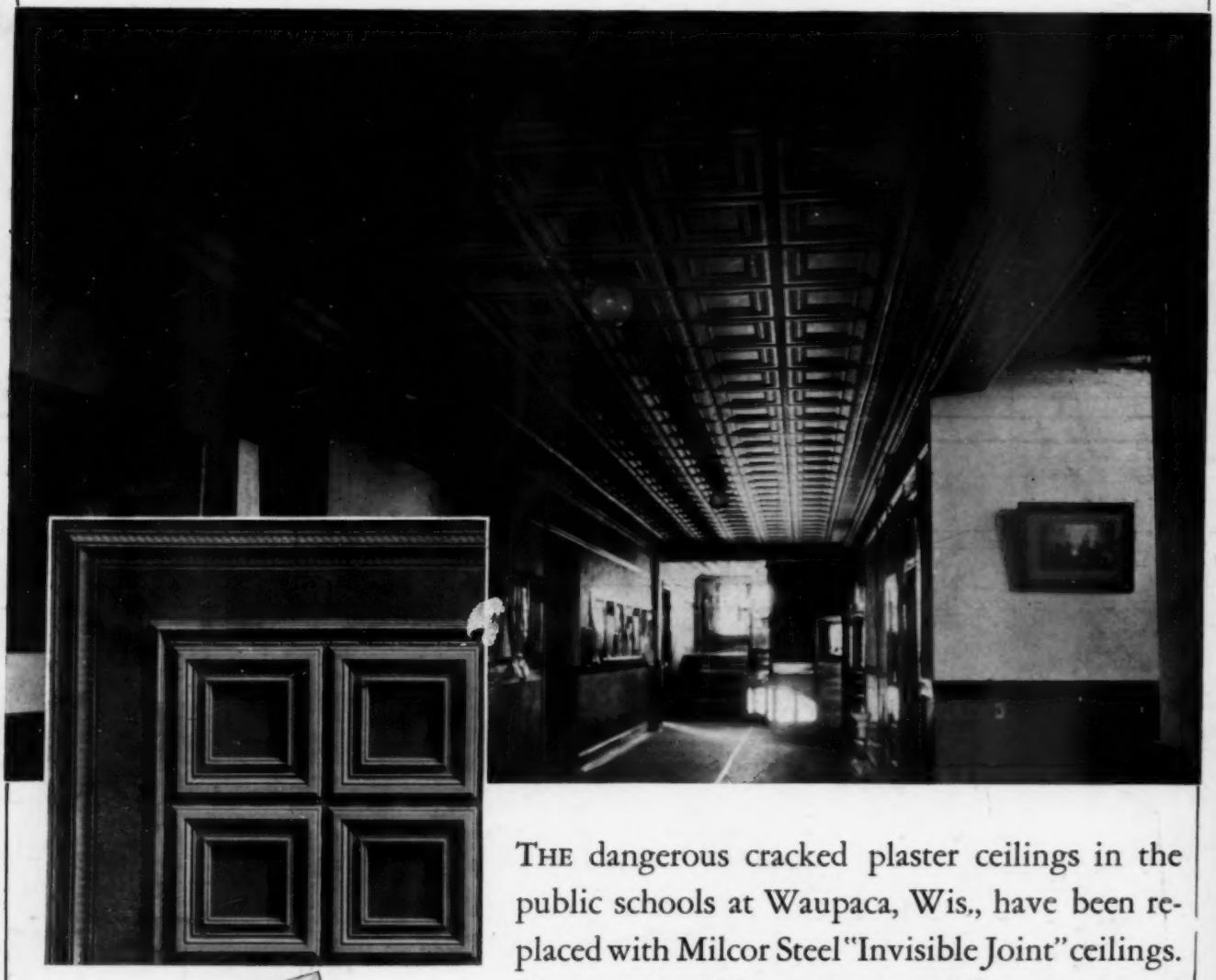

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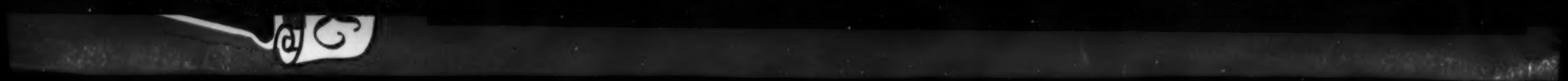
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